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SWIFT, *INTEGRAL*, *RXTE*, AND *SPITZER* REVEAL IGR J16283−4838

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ABSTRACT

We present the first combined study of the recently discovered source IGR J16283−4838 with *Swift*, *INTEGRAL*, and *RXTE*. The source, discovered by *INTEGRAL* on 2005 April 7, shows a highly absorbed [variable $N_{\rm H} = (0.4\text{–}1.7) \times 10^{23}$ cm^{-2}] and flat ($\Gamma \sim 1$) spectrum in the *Swift* XRT and *RXTE* PCA data. No optical counterpart is detectable ($V > 20$ mag), but a possible infrared counterpart within the *Swift* XRT error radius is detected in the 2MASS and *Spitzer* GLIMPSE. The observations suggest that IGR J16283−4838 is a high-mass X-ray binary (HMXB) containing a neutron star embedded in Compton thick material. This makes IGR J16283−4838 a member of the class of highly absorbed HMXBs, discovered by *INTEGRAL*.

Subject headings: gamma rays: observations — stars: neutron — X-rays: binaries — X-rays: individual (IGR J16283−4838)

Online material: color figures

1. INTRODUCTION

Star formation in our Galaxy takes place mainly in the dense regions of the spiral arms. These regions host massive molecular clouds and also the majority of the single and binary neutron stars ($\sim 10^9$) and black holes ($\sim 10^8$) in the Milky Way. The dense molecular clouds lead to strong star formation activity, which also results in the formation of binary systems and subsequently to X-ray binary systems. These objects show X-ray flares and outbursts because of accretion processes onto the compact object. At the same time, the gas and dust of the spiral arms absorb most of the emission in the optical to soft X-ray regime below 10 keV. In addition, dense absorbing atmospheres around the object make the detection of these sources even more difficult. The hard X-ray and soft gamma-ray mission *INTEGRAL* (*International Gamma-Ray Astrophysics Laboratory*) (Winkler et al. 2003) operates at energies above 20 keV. With the large field of view of the main instruments, the imager IBIS (Imager on Board the *INTEGRAL* Satellite) (Ubertini et al. 2003; $19° \times 19°$, partially coded field of view) and the spectrograph SPI (Spectrometer on *INTEGRAL*) (Vedrenne et al. 2003; $35° \times 35°$, partially coded field of view), and its observing program focused on the Galactic plane and center, *INTEGRAL* is a powerful tool for discovering highly absorbed sources ($N_{\rm H} > 10^{23}$ cm^{-2}) in the Galactic plane. So far a handful of those enigmatic objects have been found since the launch of *INTEGRAL* in 2002 October.[9] Six of those sources have been published so far: IGR J16318−4848 (Walter et al. 2003), with an absorption of $N_{\rm H} \simeq 19 \times 10^{23}$ cm^{-2} (Matt & Guainazzi 2003), IGR J19140+0951 [$N_{\rm H} = (0.3\text{–}1.0) \times 10^{23}$ cm^{-2}; Rodriguez et al. 2005], IGR J16320−4751 ($N_{\rm H} \simeq 2 \times 10^{23}$ cm^{-2}; Rodriguez et al. 2003), IGR J16393−4643 ($N_{\rm H} \simeq 10^{23}$ cm^{-2}; Combi et al. 2004), IGR J16358−4726 ($N_{\rm H} \simeq 4 \times 10^{23}$ cm^{-2}; Patel et al. 2004), and IGR J16479−4514 ($N_{\rm H} > 5 \times 10^{23}$ cm^{-2}; Walter et al. 2004). While the nature of the latter source is still unknown, the other sources appear to be high-mass X-ray binaries (HMXBs), probably hosting a neutron star as the compact object. Most, if not all, of these sources show variable absorption. In this paper we report the discovery and analysis of another highly absorbed source, IGR J16283−4838 (Soldi et al. 2005). This work makes the first use of the combined data of *INTEGRAL*, *Swift*, the *Rossi X-Ray Timing Explorer* (*RXTE*), and the *Spitzer Space Telescope*.

2. OBSERVATIONS OF IGR J16283−4838

All observations discussed in this section are summarized in Table 1.

2.1. *Discovery by INTEGRAL*

IGR J16283−4838 was discovered (Soldi et al. 2005) during the observation of the Norma arm region by the IBIS *INTEGRAL* Soft Gamma-Ray Imager (ISGRI) (Lebrun et al. 2003) on board *INTEGRAL*. The observation lasted from 2005 April 7, 13:57 UT until April 9, 4:44 UT, with an effective ISGRI exposure time of 126 ks. The source position is R.A. $= 16^{\rm h}28^{\rm m}.3$, decl. $= -48°38'$ (J2000.0) with $3'$ uncertainty. The source showed

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[9] For a list of all sources found by *INTEGRAL*, see http://isdc.unige.ch/~rodrigue/html/igrsources.html.

TABLE 1

Summary of Observations

Instrument	Date	Energy Range (keV)[a]	Flux (10^{-11} ergs cm^{-2} s^{-1})[b]	N_H (10^{22} cm^{-2})	Γ
Spitzer	2004	3.6 μm	3.5 ± 0.2 mJy	...	...
	2004	4.5 μm	3.7 ± 0.3 mJy	...	...
	2004	5.8 μm	3.5 ± 0.4 mJy	...	...
	2004	8.0 μm	2.5 ± 0.2 mJy	...	...
2MASS	1999 Jun 18	*K* band	13.95 ± 0.06 mag	...	...
	1999 Jun 18	*J* band	>16.8 mag	...	...
	1999 Jun 18	*H* band	>15.8 mag	...	...
Magellan-Baade	2005 Apr 21	*K* band	14.1 mag	...	...
Swift UVOT	2005 Apr 13/15	*V* band	>20 mag	...	...
Swift XRT	2005 Apr 13	2–10	3.9 ± 0.3	6 ± 2	1.1 ± 0.4
	2005 Apr 15	2–10	2.7 ± 0.3	17 ± 4	1.1 ± 0.4
RXTE PCA	2005 Apr 14	2–10	5.8 ± 0.3	13 ± 6	0.9 ± 0.1
	2005 Apr 14	10–20	13.2 ± 0.7	...	...
	2005 Apr 14	20–40	30.7 ± 1.5	...	...
	2005 Apr 15	2–10	4.9 ± 0.7	4 ± 4	0.8 ± 0.3
	2005 Apr 15	10–20	8.8 ± 1.3	...	...
	2005 Apr 15	20–40	20.6 ± 3.1	...	...
INTEGRAL ISGRI	2005 Apr 4–6	20–60	<1.7	...	...
	2005 Apr 7–9	20–60	4.8 ± 0.8	...	...
	2005 Apr 10	20–60	11.3 ± 1.0	...	...

[a] Energy range in units of keV if not indicated differently.

[b] Measured flux in units of 10^{-11} ergs cm^{-2} s^{-1} if not indicated differently.

a flux of $f_X = (4.8 \pm 0.8) \times 10^{-11}$ ergs cm^{-2} s^{-1} in the 20–60 keV band. No emission was detectable above 60 keV. From the analysis of another ISGRI observation with similar exposure time, we estimate the 3 σ upper limit in the 60–200 keV band $f_X < 1.2 \times 10^{-10}$ ergs cm^{-2} s^{-1}. The analysis of the data prior to the discovery, lasting from April 4, 01:55 UT until April 6, 11:24 UT with an exposure time of 192 ks, resulted in a 3 σ upper limit of $f_{20-60\ \mathrm{keV}} = 1.7 \times 10^{-11}$ ergs cm^{-2} s^{-1}. The source showed significant brightening during an *INTEGRAL* observation starting on April 10, 1:26 UT. Although IGR J16283−4838 was in the partially coded field of view of IBIS, the analysis gave an 11.6 σ detection within 96 ks with a flux of $f_{20-60\ \mathrm{keV}} = (11.3 \pm 1.0) \times 10^{-11}$ ergs cm^{-2} s^{-1} (Paizis et al. 2005). The low flux level of the source did not allow the extraction of a spectrum from the ISGRI data, and no simultaneous soft X-ray and optical observations are available, as IGR J16283−4838 was always outside the field of view of *INTEGRAL*'s Joint European X-Ray Monitor (JEM-X) and that of the Optical Monitoring Camera (OMC). No further *INTEGRAL* observations of the source were obtained.

2.2. *X-Ray Follow-up Observations*

After the discovery of IGR J16283−4838, a *Swift* follow-up observation was requested in order to obtain an X-ray spectrum and an optical measurement. The *Swift* mission (Gehrels et al. 2004) is a multiwavelength observatory for gamma-ray burst astronomy. The payload combines a gamma-ray instrument (the Burst Alert Telescope [BAT], 15–150 keV; Barthelmy et al. 2005), the X-Ray Telescope (XRT; Burrows et al. 2005), and the UV-Optical Telescope (UVOT; Roming et al. 2005). The XRT is a focusing X-ray telescope with a 110 cm^2 effective area, 23′ field of view, 18″ resolution, and 0.2–10 keV energy range. The UVOT design is based on the Optical Monitor (OM) on board ESA's *XMM-Newton* mission, with a field of view of 17′ × 17′ and an angular resolution of 2″.

Two *Swift* observations took place 3 and 5 days after the last *INTEGRAL* observation. The first started on April 13, 14:02 UT with an exposure time of 2.5 ks, which resulted in an effective *Swift* XRT exposure of 550 s. A preliminary analysis of the XRT data refined the position of IGR J16283−4838 to R.A. = $16^h28^m10^s.7$, decl. = −48°38′55″ (J2000.0), with an estimated uncertainty of 5″ radius (Kennea et al. 2005). A second observation was performed on April 15, 00:16 UT with a 2600 s effective XRT exposure time.

For our analysis of the *Swift* data we used the calibration files that had been released on 2005 April 5 and the software provided by the *Swift* Science Center. These tools are included in the release of HEAsoft version 6.0 as of 2005 April 12. Applying a centroid algorithm to the data of April 15 gives a refined position for the source of R.A. = $16^h28^m10^s.56$, decl. = −48°38′56″.4, with an uncertainty of 6″ radius, consistent with both the preliminary analysis and the *INTEGRAL* measurement. The spectra extracted from the XRT data of April 15 are shown in Figure 1. The spectral fitting was done using version 11.3.2 of XSPEC (Arnaud 1996). Both XRT spectra are well represented by an absorbed power law with the same photon index ($\Gamma = 1.12 \pm 0.35$) but different absorption column density. The observation of April 13 shows a less absorbed ($N_H = 0.6^{+0.4}_{-0.2} \times 10^{23}$ cm^{-2}) spectrum with a lower flux [$f_{2-10\ \mathrm{keV}} = (3.9 \pm 0.3) \times 10^{-11}$ ergs cm^{-2} s^{-1}] than the April 15 one. The latter data show $N_H = 1.7^{+0.5}_{-0.4} \times 10^{23}$ cm^{-2} and a flux in the 2–10 keV band of $f_{2-10\ \mathrm{keV}} = (2.7 \pm 0.3) \times 10^{-11}$ ergs cm^{-2} s^{-1}. The data are equally well fit by an absorbed blackbody with $N_H = 0.3 \times 10^{23}$ cm^{-2} (April 13) and $N_H = 1.4 \times 10^{23}$ cm^{-2} (April 15), with a temperature of $kT = 2.0 \pm 0.3$ keV. Adding a Gaussian line to the fit does not improve the results significantly. The 3 σ upper limit for the Fe Kα line at 6.4 keV is 3×10^{-4} photons cm^{-2} s^{-1}, with an equivalent width of EW < 600 eV. Because of the short exposure time, the source was not detected by the BAT instrument.

IGR J16283−4838 was then also observed twice by *RXTE* using the Proportional Counter Array (PCA). The first observation, starting on April 14, 0:46 UT lasted 3.6 ks; the second on April 15, 16:07 UT lasted 2.9 ks (Markwardt et al. 2005).

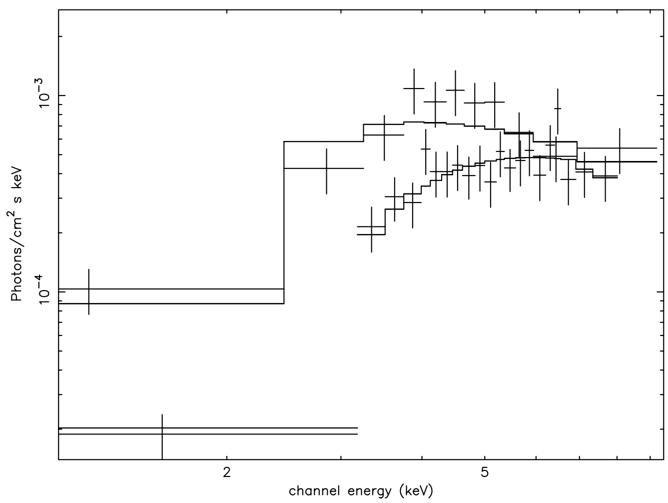

FIG. 1.—*Swift* XRT photon spectra of April 13 (*top spectrum*) and of April 15 (*bottom spectrum*). The applied fit is an absorbed power law with $N_{\rm H} = 0.6 \times 10^{23}$ cm^{-2} (April 13) and $N_{\rm H} = 1.7 \times 10^{23}$ cm^{-2} (April 15) and $\Gamma = 1.1$.

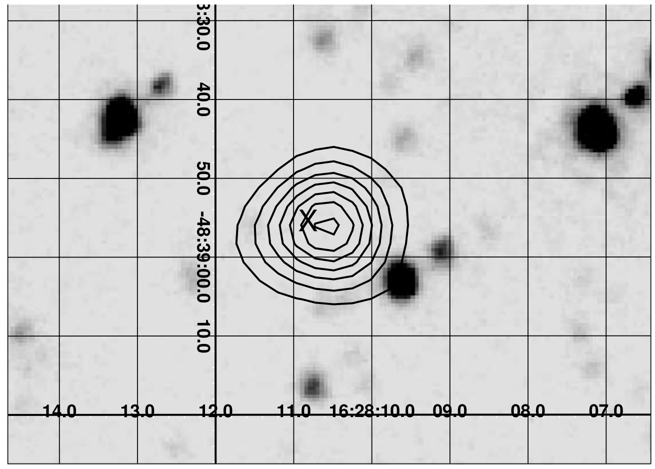

FIG. 2.—*Swift* XRT contour plot on top of the UVOT *V*-band map of IGR J16283−4838 based on a 2.6 ks observation on 2005 April 15. The cross indicates the position of the mid-infrared source SSTGLMC G335.3268+00.1016 detected by *Spitzer* and in the 2MASS. [*See the electronic edition of the Journal for a color version of this figure*.]

During both observations the PCA pointing was offset by 45′ to avoid the nearby bright low-mass X-ray binary (LMXB) 4U 1624−490. The *RXTE* PCA has a large field of view (2° FWZM). For targets near the Galactic plane, a significant amount of Galactic diffuse emission enters the PCA aperture, which is considered background. This background was modeled by taking a nearby observation of the Galactic plane (observation 91409-01-02-00, $l = 341\overset{\circ}{.}4$, $b = 0\overset{\circ}{.}6$). This observation is at a similar latitude as IGR J16283−4838, so the diffuse emission should have nearly the same spectrum. The background observation was modeled as a thermal bremsstrahlung with a temperature of $kT = 7.4$ keV, plus line emission at ∼6.5 keV with an equivalent width of 600 eV. The shape of the background template was fixed and added to the spectral model of the two PCA observations of IGR J16283−4838; only the total normalization of the template was allowed to vary. The fluxes are collimator-corrected after background subtraction. The best-fit models for the source are shown in Table 1. No pulsations are detectable in the PCA data.

2.3. *Infrared and Optical Data*

Within the 6″ error radius around the refined position determined from the *Swift* XRT data, the infrared source 2MASS J16281083−4838560 is located at a distance of 2″.7 (Rodriguez & Paizis 2005). This source has *K*-, *J*-, and *H*-band magnitudes of $K = 13.95 \pm 0.06$ mag, $H > 15.8$ mag, and $J > 16.8$ mag (95% lower limits).

The Galactic Legacy Infrared Midplane Survey Extraordinaire (GLIMPSE;[10] Benjamin et al. 2003) data show the source SSTGLMC G335.3268+00.1016 at a distance of 2″.9 from the XRT position, consistent with the 2MASS detection. GLIMPSE is a four-band near- to mid-infrared survey by *Spitzer* (Werner et al. 2004) of the inner two-thirds of the Galactic disk with a spatial resolution of ∼2″. The Infrared Array Camera (Fazio et al. 2004) imaged 220 deg^2 at wavelengths centered on 3.6, 4.5, 5.8, and 8.0 μm in the Galactic longitude range 10°–65° on both sides of the Galactic center and in Galactic latitude ±1°. The *Spitzer* GLIMPSE data show a clear detection in all four energy bands (Table 1). Another observation in the *K* band was performed with the 6.5 m Magellan-Baade telescope on 2005 April 21. This observation indicates that the source seen in the 2MASS is a blend of point sources, with the brightest showing $K = 14.1$ mag (Steeghs et al. 2005). Therefore, the identification with the *Spitzer* source is tentative. In case the infrared source is not the counterpart to the hard X-ray source, the data presented here would be upper limits for the near and mid-infrared emission.

Within the error radius of IGR J16283−4838, no optical counterpart is detectable on the POSS II plates of the Digitized Sky Survey. During the observations by *Swift* on April 13 and 15 the UVOT took an image in the *V* band. No source is detected within the error radius down to a magnitude of $V > 20$ mag. The image extracted from the *Swift* UVOT data on April 15 is shown in Figure 2. The contours indicate the XRT count map, and the cross gives the position of the mid-infrared counterpart.

3. SPECTRAL ENERGY DISTRIBUTION

The spectral energy distribution (SED) of IGR J16283−4838 is shown in Figure 3. In the chosen diagram a single power law with photon index $\Gamma = 2$ would appear as an even, horizontal line. No error bars have been included for the *Swift* XRT data, and only the XRT data of April 15 are shown for better visibility. From the comparison of the XRT data points with the measurements by *RXTE* PCA it is apparent that both were taken during a similar high state of the source, while the two *INTEGRAL* ISGRI measurements describe a lower flux state. Unfortunately, the 60–200 keV upper limit does not constrain the SED significantly.

Note that we display in the SED the absorbed X-ray fluxes as they are measured at the observer, as most of the absorption appears to be intrinsic to the source. The situation is different in the optical, where the flux is already significantly absorbed by material in the line of sight. The hydrogen column density in the direction of the source is $N_{\rm H} = 2.2 \times 10^{22}$ cm^{-2}. This leads to an extinction of $A_V = N_{\rm H}/(1.79 \times 10^{21}\ {\rm cm}^{-2}) = 12.3$ mag (Predehl & Schmitt 1995). Therefore, the unabsorbed optical limit is $V > 7.7$ mag and outside the displayed range of Figure 3. The absorption has a lower effect on the near-infrared fluxes. With $A_K = 0.112 A_V$, $A_H = 0.176 A_V$, and $A_J = 0.276 A_V$ (Schlegel et al. 1998), the unabsorbed flux values are $K = 12.7$ mag,

[10] The data are publicly available at http://irsa.ipac.caltech.edu/data/SPITZER/GLIMPSE/.

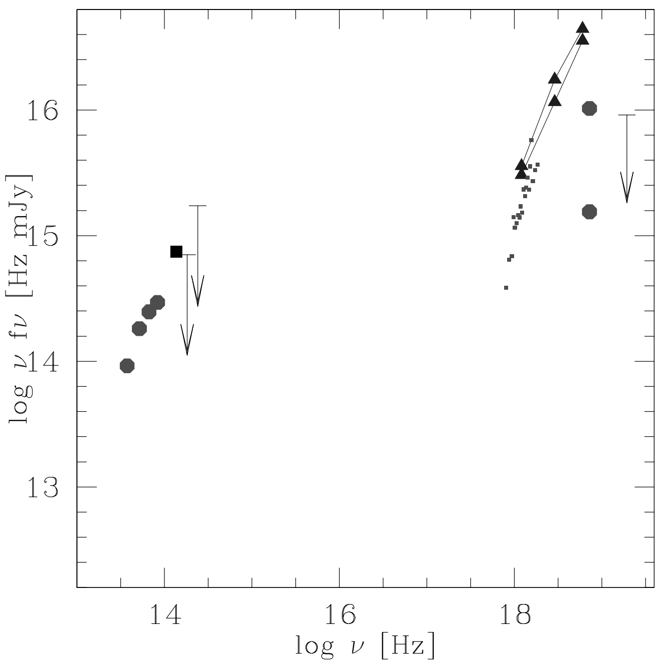

FIG. 3.—Spectral energy distribution of IGR J16283−4838. *From left to right*: *Spitzer* GLIMPSE (*octagons*), Magellan-Baade (*square*), 2MASS (*two upper limits*), *Swift* XRT (*small points*), and *RXTE* PCA data (*triangles*; *top line*: April 13, *bottom line*: April 15). The two octagons on the right represent the *INTEGRAL* ISGRI measurement on April 8 (low flux) and April 10 (higher flux). The arrow on the right shows the ISGRI upper limit at 80 keV. Unabsorbed fluxes are displayed considering the Galactic but not the intrinsic absorption. [*See the electronic edition of the Journal for a color version of this figure.*]

$H > 13.6$ mag, and $J > 13.4$ mag. The extinction in the mid-infrared range is negligible.

4. DISCUSSION

The new hard X-ray source IGR J16283−4838 exhibits several characteristic features. IGR J16283−4838 is located at Galactic longitude $l = 335\overset{\circ}{.}3$ and latitude $b = +6\overset{\prime}{.}1$ in the Norma arm region. It shows a strong flare within a timescale of days. The absorption is of the order of $N_{\rm H} = (0.4\text{–}1.7) \times 10^{23}$ cm^{-2}, with variations by a factor of 4 within 1 day and a flat X-ray spectrum ($\Gamma \simeq 1$) during all observations. The bimodal spectral energy distribution has one peak probably in the near-infrared and the other in the hard X-rays. The equivalent width of the iron Kα line is EW < 600 eV ($f_{{\rm K}\alpha} < 3 \times 10^{-4}$ photon cm^{-2} s^{-1}), and no optical counterpart is detectable ($V > 20$ mag), probably because of absorption in the line of sight.

Combining this information enables us to put constraints on the nature of the source. The position within the Galactic plane at only $+6\overset{\prime}{.}1$ makes a Galactic origin of the source likely, although some active galactic nuclei (AGNs) have been seen through the plane by *INTEGRAL*, like the Seyfert 1 galaxy GRS 1734−292 (Marti et al. 1998; Sazonov et al. 2004). Strong variability as observed in IGR J16283−4838 has been seen in the X-ray spectra of Seyfert galaxies (e.g., Dewangan et al. 2002), but the X-ray spectrum is too flat ($\Gamma \simeq 1$) for a Seyfert galaxy. This would still leave the possibility of a blazar as the counterpart. But the absorption by the Galaxy in the direction of the source ($N_{\rm H} = 2.2 \times 10^{22}$ cm^{-2}) is not high enough to explain the intrinsic absorption of 1.7×10^{23} cm^{-2}, and thus intrinsic strong absorption in the blazar would be required to explain the *Swift* XRT spectrum, but this has not been seen so far in blazar spectra.

If we consider IGR J16283−4838 to be a Galactic source, then the counterpart is likely to be one of two main types of bright and variable hard X-ray emitters: LMXBs and HMXBs. The hard X-ray spectrum with strong absorption indicates the presence of an HMXB in which no pulsations have been detected so far (Markwardt et al. 2005). In addition, the bright infrared emission, if connected to the X-ray source, would indicate a massive star as the companion of the compact object.

For an HMXB it is likely that IGR J16283−4838 is located close to a star-forming region in a Galactic spiral arm. Several arms are located along the line of sight toward the source (Russeil 2003): the Sagittarius-Carina arm (0.7 kpc), the Scutum-Crux arm (3.2 kpc), the Norma-Cygnus arm (4.8 kpc), a star-forming region (7 kpc), and the Perseus arm (10.8 kpc). The luminosity of the object during the flare can be estimated by taking the brightest stage during the *RXTE* observation and assuming a distance to the object between 1 and 10 kpc. The unabsorbed flux is in this case only 20% larger than the absorbed one, because a significant part of the luminosity is emitted in the hard X-rays. The bolometric luminosity is then in the range $\log L_{\rm burst} = 34.0\text{–}36.5$ (where L is in units of ergs s^{-1}). The quiescent luminosity of the system is at least a factor of $\sim$20 lower with $\log L_q < 33\text{–}35.2$. This range of values is consistent with measurements from known Be/X-ray binaries with a neutron star as the compact object (Negueruela 1998). In any case, the luminosity is far below the Eddington luminosity of a neutron star of 1.4 $M_\odot$ ($L = 1.8 \times 10^{38}$ ergs s^{-1}).

The properties of IGR J16283−4838 are similar to those of a number of highly absorbed sources [$N_{\rm H} = (1\text{–}20) \times 10^{23}$ cm^{-2}] found in the Galactic plane, especially in the Norma arm region (Walter et al. 2004). The HMXB IGR J19140+0951 also shows strong variable absorption (Rodriguez et al. 2005), indicating intrinsic absorption in the source. The observed properties of IGR J16283−4838 are consistent with those of IGR J19140+0951 in the bright state, in which the iron line flux decreased to 4×10^{-4} photons cm^{-2} s^{-1}, which is at the upper limit for the *Swift* XRT measurement in our case. The (non)variability of the absorption in IGR J16318−4848 is still under discussion, as Walter et al. (2003) claim constant absorption, whereas Revnivtsev (2003) discovered variable absorption that could be connected with the orbital phase of the binary system. Only one of the newly detected highly absorbed sources has been claimed so far not to be an HMXB. Patel et al. (2004) observed IGR J16358−4726 with the *Chandra X-Ray Observatory*. From the X-ray data they favor the source to be a millisecond pulsar LMXB, although the HMXB interpretation cannot be ruled out completely, but some unknown kind of spin-down torque would be required to prevent the neutron star from spinning up in this particular case.

X-ray binaries with strong intrinsic absorption had already been detected before *INTEGRAL*, for example, in 4U 1700−377, GX 301−2, Vela X-1, and CI Cam. Except for the latter, for which the nature of the source is unclear to date, these sources are also HMXBs, likely hosting a neutron star as the compact object. Vela X-1 shows variable absorption from a negligible value up to 7×10^{23} cm^{-2} (Pan et al. 1994). GX 301−2 shows strong absorption variation (up to 12×10^{23} cm^{-2}; White & Swank 1984), and so does CI Cam [$(0.02\text{–}5) \times 10^{23}$ cm^{-2}; Boirin et al. 2002]. In 4U 1700−377 the absorption is linked to the state of the HMXB system and varies by a factor of 2 between 0.9×10^{23} and 2.0×10^{23} cm^{-2} (Boroson et al. 2003). It appears that variable absorption is a common feature in highly absorbed HMXBs. This could mean that the absorbing material is linked to the existence of a high-mass donor in the binary system. In this case a strong and dense stellar wind (10^{-7} to 10^{-5} $M_\odot$ yr^{-1}) from the early-type stellar companion would probably cause the absorption in the system. The fact that all the absorbed sources so far have been shown to be HMXBs (Kuulkers 2005; Walter et al. 2004) containing neutron stars does not rule out significant contribution of HMXBs with a black hole as the compact object. But these systems are expected to be less numerous than the neutron star HMXBs by a factor of 10–100, making the detection of a black hole binary within a sample of only about 10 detected highly absorbed HMXBs unlikely. These absorbed binary systems might provide a significant contribution to the Galactic hard X-ray background at energies above 10 keV (Lebrun et al. 2004; Valinia et al. 2000).

5. CONCLUSIONS

The newly discovered hard X-ray source IGR J16283−4838, located in the Norma arm region, is likely to be an HMXB containing a neutron star as the compact object. It is located in the Galactic plane in the direction of star-forming regions in the spiral arms and shows a large flare, which makes an extragalactic origin unlikely. The spectrum is hard ($\Gamma \sim 1$) and strongly absorbed during the flare, which indicates that it is an HMXB rather than an LMXB. The luminosity is comparably low ($L < 10^{37}$ ergs s^{-1}), which is typical for a neutron star HMXB. The strong and variable absorption [$N_{\rm H} = (0.4\text{–}1.7) \times 10^{23}$ cm^{-2}] indicates that IGR J16283−4838 belongs to the class of highly absorbed HMXBs discovered by *INTEGRAL* along the Galactic plane. Bright and absorbed sources like IGR J16283−4838 could contribute significantly to the Galactic hard X-ray background in the 10–200 keV band.

It must be pointed out that the discovery and classification of IGR J16283−4838 would not be possible without combining the observations of the recent observatories in space, like *INTEGRAL*, *Swift*, *RXTE*, and *Spitzer*. Combined efforts from these missions should lead to deeper insights into the nature of the hard X-ray source population in our Galaxy in the near future.

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