

Technology Profile Fact Sheet

Title: Garnet Imager Stage

Aliases: Magneto-optic Indicator Film (MOIF); Garnet Indicator

Technical Challenge: The magnetic garnet indicator film is used to visualize magnetization patterns in magnetic media. A significant difficulty with the technology is achieving uniform contact between the media and the garnet over the entire surface area of the garnet. This uniform contact is essential for achieving high-resolution imaging.

Description: The use of garnet indicator films to visualize magnetization patterns is well known. It is also well known that the field from a magnetic recording drops off exponentially with spacing distance from the media. For the garnet imager to work optimally, it is necessary to have close contact between the garnet and the magnetic media. This technique uses air pressure in a bladder to push the magnetic media, typically recording tape, firmly against the garnet. This avoids problems with non-uniform contact over the area of the garnet and provides a remarkable means of obtaining good garnet image quality over a field of view equal to the garnet dimension. Operationally, the garnet imager is more efficient to use than a magnetic particle fluid, as no advance preparation of the solution is required, no drying time is required, and there is no contamination of the material under investigation.

This invention provides a means for performing forensic examination of the magnetization patterns on magnetic tape. It permits the operator to fix a piece of tape on a stage and examine any portion of the tape while maintaining an absolute index to the position of the tape on the stage, even though the area for observation may be larger than the area of the garnet. The invention provides a means to clamp the tape on the microscope stage, move the garnet over the clamped tape, and observe the magnetization pattern with the ability to resolve detailed features at high or low magnification. This eliminates concern of having sweet spots, in which the garnet makes good contact but the gap between the tape and the garnet causes larger areas to suffer from poor resolution.

There are a number of unique features in this invention including: 1) a platform for viewing magnetic tape using the magneto-optic effect in magneto-optic garnet indicator films; 2) use of an air bladder to apply uniform pressure between the tape and the garnet is key to this invention; 3) use of spring-loaded Teflon footed clamps to secure the tape to the stage; 4) use of a mateable upper and lower plate to locate the garnet directly over the air bladder; 5) design of the garnet holder to allow viewing of the position of the tape relative to the garnet; 6) design of the garnet holder to prevent the air bladder from distorting the tape through the tape observation slots; and 7) use of a moveable slider to permit movement of garnet to any area within the range of travel of the microscope stage without need to reposition the tape.

Demonstration Capability: A working prototype garnet imager stage has been built and tested.

Potential Commercial Application(s): Magnetic tape recording companies should be interested in this technology.

Patent Status: Patent application filed with USPTO.

Reference number: 1335