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Program:
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Research Area: Computational Earth Sciences

We seek to investigate the next generation of mathematical models used to understand climate variability.

Specifically, we propose to examine the melting and freezing of polar sea ice with a simple model. The phase change of salt water creates local salinity and temperature gradients, which, under certain conditions, are likely unstable to secondary flow regimes.   These secondary flow regimes could create a local enhancement (attenuation) of ice formation (decay).

Our main goal is to perform linear stability analyses of the governing equations for salt water to quantify various flow regimes and determine the expected behavior of sea ice in the presence of salinity and temperature gradients. If time allows, we will apply this knowledge to a simple convection model with phase change to compare results.

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