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**Chemical separation in accreting Neutron Stars** ANDRE DA SILVA SCHNEIDER, JOE HUGHTO, CHARLES HOROWITZ, DON BERRY, Indiana University — Matter accreted by a Neutron star in a binary system undergoes a variety of nuclear reactions. The ash left over from these nuclear reactions include a complex range of chemical elements which form the ocean and crust of the neutron star. Amongst the elements produced are heavy elements such as Selenium and light elements such as Oxygen. We used large molecular dynamics simulations to study Oxygen Selenium mixtures and the chemical separation that occurs when the ash freezes. We found that the liquid ocean is enriched in light elements while the crust, solid phase, is greatly enriched in heavier elements. Understanding this phase separation is important to determine the thermal conductivity and temperature profile of the star.

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