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Towards a phase diagram for accreting neutron star crusts: total energy calculations of close packed lattices TYLER ENGSTROM, VINCENT CRESPI, BENJAMIN OWEN, Penn State University — Neutron star crusts are somewhat less exotic than their cores, but may still play an important role in observable astrophysical phenomena, such as pulsar glitches and cooling rates. Recent nucleosynthesis calculations of accreting material being burned and buried on a neutron star crust indicate the possible presence of many species, ranging from around $Z=8$ to $Z=34$. In the outer crust regime where these species are completely pressure ionized and have screened-Coulomb interactions due to the relativistic Fermi electron gas, we expect some close-packed lattices may have a lower free energy than the bcc structure that is usually assumed to exist. Our poster shows the results of ground state energy calculations for several candidate binary and ternary close-packed lattices. We compare these ground state energies to those for pure phase separated bcc and fcc structures.

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