

**LABORATORI NAZIONALI DEL GRAN SASSO**

**SEMINAR ANNOUNCEMENT**

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***Nuclear reactions in  
the crusts of accreting  
neutron stars***

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*The composition of the crust of accreting neutron stars in binary systems is determined by the ashes of hydrogen and helium burning at the neutron star surface, and the nuclear processes deeper in the crust that convert the proton rich ashes into neutron rich nuclei. These nuclear processes operate continuously, driven by the mass accretion, and heat the crust creating. Because of the limited thermal conductivity this results in a characteristic temperature profile, which can be observed in transient systems when the accretion shuts off for extended periods of time. We carried out detailed nuclear reaction network calculations that identify the nuclear processes in the crust of accreting neutron stars. These reactions include electron captures with neutron emission, beta decays with neutron emission, neutron capture and dissociation, and pycnonuclear fusion reactions. We present reaction sequences for various initial compositions and different nuclear physics input.*

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