

WEEKLY CALENDAR

February 7, 2011

Departmental Colloquium

Thursday, 3:40 PM, February 10, 2011
109 Nicholson Hall

**"Nucleosynthesis in Type 1 X-ray Bursts: Studying the (α ,p)-process
with Radioactive Beams at ATLAS"**

Catherine Dørbøl
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Host: Jeffery Blackmon

• Refreshments served at 3:15 PM in 232 (Library) Nicholson Hall •

Type I X-ray bursts (XRBs) are thermonuclear explosions which occur in binary systems consisting of a neutron star accreting matter from a main sequence companion star. As matter builds up on the neutron star thermonuclear runaway occurs, and the extreme pressures and temperatures achieved allow radioactive nuclei far from stability to be synthesized. Indeed, the nuclear flow is driven towards the proton-drip line by the triple- α reaction, the (α ,p)-process, and the rapid-proton capture (rp -) process. This flow may be stalled at so-called waiting-point nuclei in the intermediate mass range if the (α ,p)-process is too weak. Specifically, ^{22}Mg , ^{26}Si , ^{30}S , and ^{34}Ar have been identified as potential waiting-point nuclei. Recent experimental work performed to measure (α ,p) reactions on these waiting points using radioactive ion beams produced at the ATLAS facility at Argonne National Laboratory will be presented. I will discuss the potential impact of these nuclei and the (α ,p)-process on the final abundances of nuclei synthesized in XRBs and the energy output during the bursts, as well as the possible effects on XRB observables, such as luminosity profiles.