astro breakout session summary – p-rich beams

C70 upgrade will increase proton-rich beam intensities

will enable measurements at lower energies which are crucial for nova nucleosynthesis 17F(p,gamma), 18F(p,alpha), 14O(alpha,p)

p-rich beams make possible studies of nu – p process, p-process, and long-lived radionuclides (56Ni, 44Ti …) in supernovae

new instrumentation (gas target, super orruba, vandle) coupled with higher intensities enables powerful, complementary investigations of high priority astro issues

C70 upgrade will facilitate p-rich ISOL beam development

important for new studies in nova & X-ray burst nucleosynthesis at HRIBF

exciting possibility of parasitic beam extraction coupled to a diagnostic station for development of high-power ISOL targets

important for astrophysics studies using ISOL beams from FRIB and other facilities

astro breakout session summary – p-rich beams

C70 upgrade enables parasitic production of long-lived radionuclide samples

useful for producing p-rich beams such as 7Be, 44Ti, 26Alg

C70 upgrade will enable systematic nuclear structure measurements along the N=Z line useful for explosive nucleosynthesis studies

we specifically discussed measurements of

novae: 17F(p,gamma), 18F(p,alpha), 14O(alpha,p) 25Al(d,n), (3He,d), (d,n), and (p,p) on 26Alg and 26Alm,
X-ray bursts: 56Ni(d,n), (alpha,p) on 26Si, 29,30P, 30,31S, 33,34Cl
supernovae: 55Co(p,g), 74As(p,g) ...

astro breakout session summary – n-rich beams

C70 upgrade will enable measurements FAR from stability of masses, lifetimes, and beta-delayed neutron decay needed for supernova studies

examples are 136,138Sn, 86-88Ge …

powerful instrumentation (LeRIBBs, VANDLE, ORISS …) exist or under development

probes the r-process at earlier times / higher temperatures

C70 upgrade will dramatically increase intensities of n-rich beams near closed neutron shell N=50, 82

enable transfer reactions not currently possible – 134Sn(d,p), 136Te(d,p), 84Ge(d,p)

*enable multiple, complementary studies **beyond** (d,p) --*
(d,t), (3He, a), (t,p) (3He,n) (d,3He) on 132Sn

combination of GRETINA and super ORRUBA would allow precision determination of level parameters using (d,p gamma) coincidences

level density studies and spin distributions will be possible,
needed for HF (n,g) rate calculations

provide valuable information for structure models FAR from stability

astro breakout session summary – n-rich beams

C70 upgrade will enable parasitic production of long-lived radionuclides useful for (d,p) measurements in normal kinematics

s-process branch points in AGB stars, and other n-rich nuclei