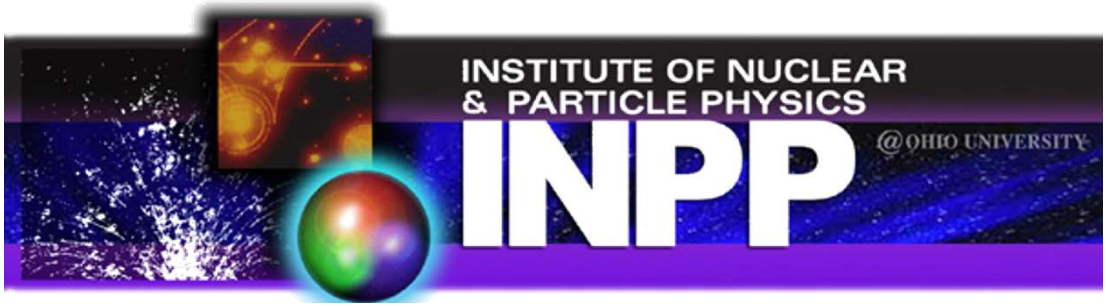

Searching for potential $^{12}C+^{12}C$ resonances with coincidence $^{24}Mg(\alpha,\alpha')^{24}Mg$ reactions

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The $^{12}C+^{12}C$ reaction is one of the most important in nuclear astrophysics, influencing superbursts, the *s*-process in massive stars and Type Ia supernovae. We need to know the reaction rates for the two competing reactions $^{12}C(^{12}C,p)^{23}Na$ and $^{12}C(^{12}C,\alpha)^{20}Ne$. Direct measurements are rather challenging due to the fiendishly low cross section and so indirect methods which can help to identify potential resonances in the reaction are useful in guiding direct measurements and estimating rate contributions.

In this talk, I will present some circumstantial evidence for $^{12}C+^{12}C$ resonance structures obtained from a study of the $^{24}Mg(\alpha,\alpha')$ reaction and subsequent charged-particle decays with the K600 Q2D magnetic spectrometer at iThemba LABS, Cape Town, South Africa, and the Coincidence Array for K600 Experiments (the CAKE), an array of double-sided silicon strip detectors. The obtained results will be compared with various other direct and indirect measurements to try to justify why some of the structures may be $^{12}C+^{12}C$ resonance structures, and to explain why different experimental probes may have missed them.

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11:50 am EST