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Development of the Silicon Array at Notre Dame (SAND) for the Study of the 12C + 12C Reaction at Sub-Coulomb Energies[1] CRAIG CAHILLANE, University of Notre Dame - Nuclear Science Lab — The 12C + 12C fusion reaction is an important process in stellar evolution and nucleosynthesis. The energy region of interest lies between 1 and 3 MeV, but studying the reaction at these energies is difficult because of the reaction's rapidly decaying cross-section a sub-Coulomb energies. Both detector efficiency and beam intensity limit such measurements. As a test run for the future Silicon Array at Notre Dame (SAND), two YY1 Trapezoid Silicon Detectors were used to detect the proton decay of the carbon fusion reaction. The two detectors covered a solid angle of 0.34 steradians. In the construction of SAND, more large surface area silicon detectors will be used to dramatically increase detection efficiency by covering a much larger solid angle. Combined with the new high-intensity 5 MV accelerator also under construction at Notre Dame, SAND could reduce the error on low energy cross sections in the astrophysical region and possibly detect hypothesized resonances at lower energies.

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Craig Cahillane
University of Notre Dame - Nuclear Science Lab

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