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Charged Fusion Product Detector Study[1] CARLOS LOPEZ, None, FLORIDA INTERNATIONAL UNIVERSITY DEPARTMENT OF PHYSICS COLLABORATION, PRINCETON PLASMA PHYSICS LABORATORY COLLABORATION, CULHAM CENTRE FOR FUSION ENERGY COLLABORATION — Plasmas are hot ionized gases which may be manipulated by electromagnetic fields in machines called tokamaks, which are experimental reactors created to harness energy when fusion occurs in said plasma. In order to study instabilities within the tokamak plasma, the trajectories of protons were studied with an array of silicon surface barrier detectors. The collection efficiency of the detectors was analyzed in order to make more accurate calculations, where particular attention was paid to the solid angle of acceptance, or the angular distribution through which particles would enter into the detector. Monte Carlo simulations were coded and implemented in the Python language, where a point on the grid acted as a source which one million data points shot at the plane of the detector. The ratio of the hits versus the misses was calculated for varying positions of the source relative to the plane of the detector. These results were compared to an alpha particle spectroscopy experiment, where a radiation source emitting alpha particles was placed at varying positions relative to the detector. The counting rate of the detector was then observed when it was exposed to the source, and this along with the Monte Carlo results were implemented into an efficiency calculation.

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