

MEASUREMENT OF THE $^{16}\text{O} + ^{16}\text{O}$ ELASTIC SCATTERING CROSS SECTION BELOW THE COULOMB BARRIER

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In recent decades, the processes of fusion of ^{16}O were studied both theoretically [1,2] and experimentally [3,4,5,6,7,8], because the fusion reaction $^{16}\text{O}+^{16}\text{O}$ is essential for understanding the nuclides burning processes in advanced stages of stellar evolution, contributing significantly to the production of heavier elements. However, the lowest center-of-mass energy reached in these previous studies was around 6.5 MeV, but at this energy the discrepancies between the different experimental results at sub-barrier energies are around a factor of 3. Moreover, the theoretical calculations are unable to fit both elastic scattering cross sections and fusion S-factors. In the aim of the study of the $^{16}\text{O}+^{16}\text{O}$ fusion reaction, we present the experimental elastic scattering cross section in the region of astrophysical interest ($E_{\text{c.m.}} = 5\text{-}8$ MeV). For this purpose, we used the 3.0 MV Tandem Accelerator located at the Laboratory of Accelerators and Radiation Technologies at CTN (Sacavém - Portugal) with a new nuclear reactions chamber and detectors geometry.

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