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Measurement of the ^{12}C+^{12}C Fusion Reaction with MUSIC[1]

P.F.F. CARNELLI, Laboratorio Tandar, Argentina, S. ALMARAZ-CALDERON, D. HENDERSON, K.E. REHM, M. ALBERS, M. ALCORTA, P.F. BERTONE, H. ESBENSEN, Argonne National Laboratory, J.O. FERNANDEZ-NIELLO, Laboratorio Tandar, Argentina, C.L. JIANG, Argonne National Laboratory, J.C. LIGHTHALL, S.T. MARLEY, Argonne National Laboratory and Western Michigan Univesity, T. PALCHAN-HAZAN, R.C. PARDO, Argonne National Laboratory, M. PAUL, Hebrew University, Jerusalem — The fusion of the ^{12}C+^{12}C system is of great interest in nuclear structure and nuclear astrophysics. Above the Coulomb barrier, the excitation function of this system exhibits oscillations, which are not well understood. There is also a significant discrepancy between the experimental fusion cross-section and recent coupled-channel calculations that is not present in other carbon systems. To address these issues, we have re-measured the fusion excitation function for ^{12,13}C+^{12}C in the energy range of 10 MeV $<$ E$_{cm}$ $<$ 20 MeV using a Multi-Sampling Ionization Chamber (MUSIC) detector. The gas of the ionization chamber (CH_4) served as both the target material and the counter gas. One of the main advantages of this method is that the excitation function is measured over a large range of energies using only one beam energy. This method has been proven to be successful and it will be used to measure fusion reactions in other light systems. The experimental results will be presented and compared to previous experimental data and theoretical models.

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Sergio Almaraz-Calderón
Argonne National Laboratory

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