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Study of the ^{20,22}Ne + ^{20,22}Ne and ^{10,12,13,14,15}C + ^{12}C fusion reactions with MUSIC

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Fusion cross sections measurements play an important role for both nuclear structure and nuclear astrophysics. For example,
fusion reactions between light neutron-rich nuclei have been proposed to be a possible energy source in X-ray superbursts
that originate in the crust of an accreting neutron star.
Experimental fusion reaction studies are essential to test the predictive power of the theoretical models for the fusion
reactions that are included in calculations of superbursts.
The development of the MUlti-Sampling Ionization Chamber (MUSIC) detector has opened new possibilities for fusion reaction
studies. The high efficiency and flexibility to measure the excitation function of fusion reactions in a large energy range
in a single measurement make the MUSIC detector an ideal tool for performing measurements of fusion cross sections
with radioactive beams.
A systematic study of the excitation function of the ^{20,22}Ne + ^{20,22}Ne and ^{10,12,13,14,15}C + ^{12}C systems using the MUSIC detector
has been performed at ATLAS. The experimentally extracted excitation functions and comparison with theoretical predictions will be presented.

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