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Search for the Neutron Dripline for Fluorine and Neon Isotopes

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Particle-bound isotopes along the neutron dripline have been searched for fluorine ($Z = 9$) and neon ($Z = 10$) isotopes at the RIKEN RI Beam Factory (RIBF) by using projectile fragmentation of an intense ^{48}Ca beam at 345 MeV/nucleon and the large-acceptance fragment separator BigRIPS. Observation of null counts for ^{32}F , ^{33}F and ^{35}Ne , ^{36}Ne isotopes and comparison with their expected production yields have showed that existence of particle-stable states of these isotopes is excluded with high confidence levels. It is thus found that the most neutron-rich isotopes ^{31}F and ^{34}Ne previously observed are the heaviest of these isotopes. The confirmed neutron driplines have thus been extended for the first time since nearly 20 years ago, in which the ^{24}O isotope was confirmed to be on the dripline of oxygen ($Z = 8$) isotopes. The present determination of neutron driplines will provide keys to understand the nuclear stability at extremely neutron-rich conditions.

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