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P3.081 Test of the electric charge conservation law in the Borexino experiment

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Despite the fact that the electric charge conservation law is confirmed by many experiments, search for its possible violation remains a way of searching for physics beyond the Standard Model. Experimental searches for the electric charge non-conservation mainly consider electron decays into neutral particles. The Borexino experiment is an excellent tool for the electron decay search due to the highest radiopurity among all the existing experiments, large detector mass, and good sensitivity at low energies. The process considered in this study is a decay into a photon and a neutrino, for which a new lower limit on the electron lifetime is obtained. This is the best electron lifetime limit up to date, exceeding the previous one obtained at the Borexino prototype at two orders of magnitude.