Experimental researches on the two-proton emissions from the excited states of proton-rich nuclei close to the drip-line


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Remarkable progress on exotic two-proton (2p) radioactivity proposed theoretically about half a century ago was achieved experimentally in the last decade. An unusual diproton (sometimes referred to \(^{2}\text{He}\)) decay has been reported [1,2] through the investigation of correlations between two protons (\(p-p\) correlations). However the decay mechanism is still unclear. A series of experiments have been performed by complete-kinematics measurements at HIRFL-RIBLL facility to study the 2p emissions from the excited states of the proton-rich nuclei close to the drip line, such as \(^{17,18}\text{Ne},\ ^{28,29}\text{S},\ ^{27,28}\text{P},\ etc\). Results indicate that 2p skin/halo structure rather than the large deformation is responsible for correlated 2p emissions. A link between ground-state configuration and excited-state 2p emission is pointed out.


Relative momentum (left) and opening angle (right) between two protons emitted from the 10 MeV excited state of \(^{29}\text{S}\).