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First results from IS-510: Transfer reactions and Coulomb excitation with T-REX in the 68Ni region

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The microscopic details concerning the assumed magicity of the 68Ni nucleus are not yet fully understood. Due to the parity change between fp orbitals and the g9/2 orbital, a small gap between these can lead to a high-lying first excited state in 68Ni. This underlying subshell structure seems also responsible for the unusual behavior of excited 0+ states in neighboring even-even nuclei.
Our experiment IS-510 uses two complementary methods to explore these questions in detail: Transfer reactions and Coulomb excitation.
In 2011, the 2n transfer towards 74Zn was used to search for the unknown excited 0+ states beyond N=40. The Si-array T-REX together with MINIBALL were used to study excited states up to 5 MeV in 74Zn. At the same time, first data on Coulomb excitation of 72Zn were detected in forward direction.
In 2012, a new Si setup was used. This setup was specially designed to study the multiple Coulomb excitation and includes a movable forward Si-detector as well as the detection of scattered beam-particles in backward direction. This increases the sensitivity for the determination of quadrupole moments and mixing ratios. A high intense 72Zn beam of 100 pA was delivered to the MINIBALL target, allowing to observe multiple-step (off-Yrast) coulomb excitation events in this shell-model driven system.
We present first results of the IS-510 data.

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