Coulomb excitation of neutron-rich ^{138,140,142}Xe at REX-ISOLDE *

Th. Kröll[1], T. Behrens[1], R. Krücken[1], R. Gernhäuser[1], P. Maierbeck[1], V. Bildstein[1]
for the REX-ISOLDE and MINIBALL collaborations

[1] *Physik-Department E12, TU München, 85748 Garching, Germany*

Recent experiments in the surrounding of the doubly magic ^{132}Sn have shown that for very neutron-rich nuclei far off the valley of stability the $B(E2; 0^+_{\rm gs} \rightarrow 2^+_1)$ values are lower than expected from systematics [1,2]. Proposed explanation is a reduced neutron-pairing above $N = 82$ resulting in a large neutron contribution to the wave functions [3].

Aim of our research programme performed at the REX-ISOLDE facility at CERN is to extend such studies in this region in order to clarify the underlying physics. In our first campaign we investigated the neutron-rich isotopes ^{122,124}Cd. Our preliminary $B(E2)$ values for these isotopes are consistent with expectations for vibrational nuclei [4]. Above the $N = 82$ closure, we studied in a subsequent experiment the isotopes ^{138,140,142}Xe.

We employed γ-spectroscopy following "safe" Coulomb excitation of radioactive Xe beams at an energy of 2.84 MeV/u impinging on a ^{96}Mo target. The γ-rays from deexciting the nuclei were detected by the highly efficient MINIBALL spectrometer consisting of 8 triple clusters of six-fold segmented HPGe detectors. The reaction kinematics was determined by detecting the scattered particles in a double-sided segmented Si detector (DSSSD).

For all three isotopes, we collected high statistics for the $2^+ \rightarrow 0^+$ transitions. Additionally, also the excitation of the first 4^+ state has been observed. The $B(E2)$ values of ^{138,142}Xe will be determined for the first time, whereas for ^{140}Xe the contradiction between the two different values existing in literature will be resolved.

We will present the status of our analysis and discuss the perspectives for future experiments.

* This work is supported by the German BMBF under grant No. 06MT190.

[1] D. C. Radford *et al.*, Phys. Rev. Lett. 88, 222501 (2002).
[2] D. C. Radford *et al.*, Proceedings of conference ENAM'04, Eur. Phys. J. A 25, s01, 383 (2005).
[3] J. Terasaki *et al.*, Phys. Rev. C 66, 054313 (2002).
[4] Th. Kröll *et al.*, Proceedings of conference ENS'05, AIP Conf. Proc. - Vol. 802, 283 (2005).