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Mass measurements of neutron-rich copper isotopes and technical developments at ISOLTRAP

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We present very recent ISOLTRAP [1, 2] measurements of neutron rich copper isotopes, where –with the help of the multi-reflection time-of-flight mass spectrometer $-^{79}$ Cu was reached for the first time. Having only one proton above the Z = 28 core, the binding energies of the copper isotopes are sensitive to the evolution of nuclear shell structure close to the doubly-magic ⁷⁸Ni isotope. The measurements belong to an extended ISOLTRAP campaign on very neutron-rich nuclides for nuclear-structure and astrophysical cases To reach out to even further exotic nuclides at very high precision, a position-sensitive ion detector was installed behind the precision Penning trap. It will allow the application of the Phase-Imaging Ion-Cyclotron-Resonance (PI-ICR) [3] method, which was developed at SHIPTRAP/GSI. This new technique offers higher precision in less measurement time as well as a much higher resolving power, and thus ability to resolve low-lying isomers, compared to the present Time-of-Flight Ion-Cyclotron-Resonance technique [4]. The current status and an outlook on the implementation of the PI-ICR technique at ISOLTRAP will be presented

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References:

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