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High-resolution measurements of the 1s(2s)^2 state decay branches in Li-like uranium

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The proposed experiment is aiming at the first high-resolution measurement of the exotic, dipole allowed, "two-electron one-photon" decay (TEOP) of the $1s(2s)^2$ state in the heaviest Li-like ion (U^{89+}). This transition is mediated by electron-electron correlation and in lithium-like uranium it is (surprisingly) expected to be the dominant decay mode. However, it is entwined with an M1 transition of very close transition energy. The use of high-resolution microcalorimeters will allow the separation of the two transitions and thus a clear identification of the TEOP decay. In addition, the relative decay rates can be measured for the first time, thus testing the corresponding theoretical predictions that differ considerably between different models. In addition to the radiative decay branches, the Auger decay channel will be measured as well, thus allowing for a complete measurement of all the decay channels of this particular quantum state.

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