

# Experimental Demonstration of Breit-Interaction-Dominant Angular Distribution of X-ray Emission in Dielectronic Recombination

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## Abstract

We report the experimentally determined angular distribution of the  $[1s2s^22p_{1/2}]_1 \rightarrow [1s^22s^2]_0$  transition in Li-like Au. Recently, Fritzsche *et al.* [Phys. Rev. Lett. **103** 113001 (2009)] predicted that the Breit interaction plays a dominant role in the angular distribution (or the polarization) of X-ray emission in dielectronic recombination (DR) of Li-like heavy ions. However, the predicted phenomenon has not yet been observed experimentally because it is technically difficult to measure the angular distribution of hard X-rays emitted from highly charged heavy ions by using conventional methods. To overcome these difficulties, we combine two different measurements with an electron beam ion trap (EBIT) to obtain the X-ray angular distribution. One is the X-ray measurement at 90° and another is the integral resonant strength measurement through the ion charge abundance in the EBIT. Our measurements agree well with the theoretical prediction and confirm the dominance of the Breit interaction in the DR process.