

Experimental Investigation of Double Coherent Resonance of Li-like Ar in Si-crystal

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Introduction

We report on the experimental investigation of double resonant coherent excitation of Li-like Ar ions in traversing a Si crystal. The experiment was performed at the HIMAC accelerator at the National Institute of Radiological Science in Chiba, Japan.

Single and double excitation of incoming Argon ions were detected by measuring the change in the yield of different charge states of the projectile after passing through a Si crystal of 10 micron thickness. The measurements have been performed for different crystal orientations by using a two-dimensional position sensitive Si-detector.

Experiment

By passing a target with a regular structure, ions can be excited when the frequency of the field created by the atoms of the ordered structure matches the frequency of an electronic transition into the ion. The excited state will de-excite via ionization and photon emission. By measuring the charge state distribution, electron and x-ray spectra from the ions after traversing the target, different excitations modes can be identified with large precision. In the present experiment single and double excitations in Li-like ions were measured.

The typical resonance spectrum is shown in the fig. 1 where the 2s to 3p transition is identified.

Fig. 1: 2s-3p transition in Li-like Argon single excited in Si crystal.

References

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