## Extraction of level density and gamma-ray strength function of 28Si using the Oslo method

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The Oslo Cyclotron Laboratory (OCL) have developed a method, known as the Oslo method, to extract the nuclear level density (NLD) and  $\gamma$ -ray strength function (GSF) simultaneously from particle- $\gamma$  coincidence measurements. So far, the method has been tested and found successful for (more exotic) deformed rare-earth nuclei and for weakly deformed 148,149Sm nuclei. For lighter nuclei, where the statistical properties are less favorable, the foundation of the method is more uncertain. An attempt was made in 2003 to use the Oslo method to extract the NLD and GSF of 27,28Si. However, due to the limited technology and detection methods at the time, the efficiency and the resolution was too poor. Hence, in order to fully assess the Oslo method 's applicability to lighter nuclei, further testing is necessary. As part of my thesis the Oslo method has been applied to 28Si, using the (p,p' $\gamma$ ) inelastic scattering reaction. I successfully extracted the NLD up to 11 MeV for both NaI(TI) and LaBr3(Ce) detectors, though some differences were observed. For instance, a 4.6 MeV peak with 4+ spin is clearly visible in the LaBr3(Ce) data, but absent in the NaI(TI) data. The GSF proved to be challenging, due to the statistical limitations of the dataset. However, by employing an alternative approach, the GSF was successfully extracted. The significance of these findings lies not only in demonstrating that the NLD of lighter nuclei can be reliably extracted using this method, but also in providing direct evidence of the important role that energy resolution plays in nuclear structure research.

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