Precise Determination of Areal Density of Fission Targets

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The determination of the areal density and the layer nonuniformity of the fissile deposits delivers the dominant error in absolute fission cross section measurements by means of the time correlated associated particle method /1/. Therefore, a low geometry alpha counting system was developed at the Technical University of Dresden in order to perform independent measurements of the areal density of sample deposits produced and assayed at the V.G. Khlopin-Radium Institute in Leningrad, USSR. Various sets of diaphragmas have been designed and optimized for high and low activity samples. The relative errors of the solid angle measurements were reduced to values less than 0.3 per cent. A typical value of the relative error in a areal density measurement of a ^{235}U sample amounts to about 0.5 per cent.

References

/1/ R. Arlt, W. Meiling, H.-G. Ortlepp et al., Kernenergie 2 (1981) 48