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Investigation of the focusing properties of U and S arrangement 45 and 30 dgrs two-stage parallel-plate analyzers with retardation between stages

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The focusing properties of two-stage (tandem) ideal parallel plate mirror analyzer (PPA) are investigated both analytically using Mathematica [1] and in simulations using SIMION [2]. Both U and S arrangements [3] for 45 and 30 dgrs tandems are investigated for 1st and 2nd order focusing conditions, energy dispersion, trace width, overall transmission and detection solid angle. The effect of a retardation stage between the two stages to improve overall energy resolution is also included. Optimization conditions for highest energy resolution and transmission are explored. Our results are compared to analytical formulas used in applications of the U arrangement 450 tandem in zero-degree Auger projectile spectroscopy (ZAPS) [4-6]. These results could have bearing on the solid angle correction factor [5, 7] used in the recent investigation of the R = σ(4P)/σ(2P) ratio of cross sections [5], where the yield of the long-lived 1s2s2p 4P measured by ZAPS has to be correctly normalized to the prompt 2P yield. This is a work in progress and results to date are presented.

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