Statistical Shell Model Results for Neutrinoless Double β-decay Nuclear Transition Matrix Elements

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Statistical shell model (SSM - also called spectral distribution method or statistical spectroscopy method) based on random matrix theory and spherical shell model gives a theory for calculating neutrinoless double beta decay nuclear transition matrix elements (NDBD-NTME). This theory is applied to ^{76}Ge, ^{82}Se, ^{100}Mo, ^{124}Sn, ^{130}Te and ^{136}Xe NDBD-NTME. In these calculations, the Bethe's spin-cutoff factor and a bivariate correlation coefficient are varied in a range dictated by random matrix theory and trace propagation. The calculated NDBD-NTME are compared with the results from several other models as available in literature. The statistical shell model results are in general a factor 2 smaller compared to those from the spherical shell model. This shows that further work on relaxing various approximations used in SSM is needed in future for making SSM approach more competitive.