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Effects of mass anisotropy, thickness and disorder on the spin susceptibility of the 2DEG in AlAs QWs MARIAPIA MARCHI, STEFANIA DE PALO, GAETANO SENATORE, Democritos INFN-CNR and Università di Trieste, SAVERIO MORONI, Democritos INFN-CNR and SISSA — We present predictions of the spin susceptibility χ_s , obtained from extensive DMC simulations, for a two dimensional (2D) electron gas (EG) with mass anisotropy appropriate to AlAs QWs[1], both in the strictly 2D limit and with thickness included. We demonstrate that in the one-valley case anisotropy suppresses χ_s substantially at all densities and in particular at those relevant to experiments[1], the effect being larger at lower density. This suppression adds onto the one due to thickness[2,1]. The comparison of our results for a model EG including both thickness and anisotropy with experiments for AlAs QW's[1] reveals the role of disorder in determining the measured spin susceptibility. In the two-valley case we find an interesting interplay of anisotropy and valley degree of freedom in determining the EG properties and in particular the spin susceptibility. [1] T. Gokmen et. al., Phys. Rev. B in press and cond-mat 0711.1294. [2] S. De Palo et. al., Phys. Rev. Lett. 94, 226405 (2005); and to be published

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