## T04a A numerical study of cosmic shear

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The cosmic shear is correlated distortions in the images of distant galaxies due to the gravitational lensing caused by large-scale structures located between source galaxies and us. It has been theoretically predicted that statistics of the cosmic shear signals such like the two-point correlation function or the power spectrum of image ellipticities or lower order moments of probability distribution function of the lensing convergence (variance and skewness) can be promising measures of cosmological parameters ($\Omega_m$, $\Omega_\Lambda$) and also $\sigma_8$. The theoretical predictions of the statistics of the cosmic shear, which has been made so far, is based on the perturbation theory. It has been, however, claimed that nonlinear effects such like a lens-lens coupling or deflections of light rays which have been neglected in the theoretical prediction can cause systematic errors in prediction of the statistics of the cosmic shear.

We performed the ray-tracing simulation in cold dark matter models combined with large N-body simulations to investigate possible nonlinear effects on the prediction of cosmic shear statistics. Our basic conclusion is that as far as the power spectrum and two-point correlation functions are concerned the theoretical prediction based on the perturbation theory is sufficiently accurate. We also discuss a possible effects of the nonlinear terms on the skewness of probability distribution functions of the lensing convergences.