Curvature constraints from Large Scale Structure

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Abstract. We modified the CLASS code in order to include relativistic galaxy number counts in spatially curved geometries; we present the formalism and study the effect of relativistic corrections on spatial curvature. The new version of the code is now publicly available. Using a Fisher matrix analysis, we investigate how measurements of the spatial curvature parameter Ω_K with future galaxy surveys are affected by relativistic effects, which influence observations of the large scale galaxy distribution. These effects include contributions from cosmic magnification, Doppler terms and terms involving the gravitational potential. As an application, we consider angle and redshift dependent power spectra, which are especially well suited for model independent cosmological constraints. We compute our results for a representative deep, wide and spectroscopic survey, and our results show the impact of relativistic corrections on spatial curvature parameter estimation. We show that constraints on the curvature parameter may be strongly biased if, in particular, cosmic magnification is not included in the analysis. Other relativistic effects turn out to be subdominant in the studied configuration. We analyze how the shift in the estimated best-fit value for the curvature and other cosmological parameters depends on the magnification bias parameter, and find that significant biases are to be expected if this term is not properly considered in the analysis.