

Forward-modelling Stage IV galaxy surveys for precise cosmological measurements

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Stage IV experiments are set to provide the stringent constraints ever on cosmological parameters. However, to achieve this aim, we need careful control of the systematics, especially those related to the accurate knowledge of the tomographic redshift distributions. The forward-modelling of photometric and spectroscopic galaxy surveys, a method that bridges cosmology with galaxy evolution, arose as one of the most promising approaches to solve the problem of accurate galaxy redshift distribution estimates. In this talk I will discuss the past (Tortorelli+18,20,21) and on-going efforts (Tortorelli+24) in forward-modelling galaxy surveys, from the modelling of the galaxy population to the simulation of images and spectra using simulators I developed. I'll show that forward-modelling already provides precise redshift distribution estimates and that this method can reach the precision required by Stage IV surveys using a new galaxy population model based on stellar population synthesis that I developed (GalSBI), from which I am able to draw intrinsic distributions of physical galaxy quantities, such as stellar masses, SFHs, metallicities, gas, dust and AGN properties.

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