Abstract

A high precision local measurement of the Hubble constant Ho provides direct insight into the physics of the accelerating Universe, a topic that will dominate (astro)physics for decades to come. There is at present an intriguing indication of a significant tension between local measurements of Ho (SH0ES project: 73.24+-1.74 km/s/Mpc, Riess at al 2016, ApJ, 826, 56; see also Freedman et al 2012), which are independent of any cosmological model, and the indirect, highly model-dependent estimate provided by the Planck CMB experiment within the framework of the LambdaCDM concordance cosmological model (67.8+-0.9 km/s/Mpc, "Planck 2015 results XIII", 2016 A&A, 594, 13). If confirmed at a higher significance, this is an unambiguous indication of new physics beyond LambdaCDM, a fact that would have a most profound impact.
In this context, we are carrying out a multi-tiered observational campaign with FLAMES and KMOS at ESO's VLT to assess at percent level accuracy the impact of the chemical composition of Cepheid stars on the Cepheid-Supernova type Ia distance ladder upon which the SH0ES Riess et al (2016) local measurement of Ho rests. If not properly accounted for, the effect of chemical composition is expected to bias Ho at the 1.5-2% level, eating up by itself the entire error budget available for the SH0ES determination of the Hubble constant.
In this talk I will present our project, its status and future perspectives for precision Ho measurements and their implications.