Contribution ID: **24**   Type: **not specified**

Survey of Surveys: homogeneous radial velocities for 10 million stars

Wednesday 20 October 2021 12:10 (15 minutes)

In this talk, I will present a comprehensive catalog (Survey of Surveys, SoS) to meaningfully merge the main parameters of the largest ground-based spectroscopic surveys to date (RAVE, APOGEE, GALAH, Gaia-ESO, and LAMOST) using Gaia astrometry as reference. The main steps for the compilation of SoS include i) the cross-match algorithm (XM) between Gaia and the spectroscopic surveys, ii) the cross calibration of the main stellar parameters (radial velocities, effective temperature, surface gravity, and metallicity) to remove biases, and iii) the technical validation of our results in comparison to independent high quality samples.

We use the official Gaia XM algorithm (Marrese et al. 2017, 2019) which takes into account the position, proper motion, and parallax in conjunction to their errors, stellar density, epoch, and angular resolution to find the best match. The cross calibration relies on a statistical analysis of the common samples to identify spurious trends and offsets and to perform a reliable error normalization between surveys. The cross calibration arises from data mining techniques to define the 'clean' samples with the most reliable parameters for each survey. As a result, we provide an internally calibrated catalog that is later validated with high quality samples (stellar clusters, asteroseismic and high resolution spectroscopic samples). Additionally, we provide errors on the parameters corresponding to a more realistic representation.

SoS guarantees homogeneity and accuracy for several millions of stars, around 10 million with accurate radial velocities and over a million with accurate atmospheric parameters. This pilot study gives insights on how to homogenize the products of large surveys which can be applied to the upcoming 4MOST, WEAVE, and instruments such as HRMOS. Depending on their overlap with SoS and the accuracy of the above samples, they can also be used to revise and update the current SoS reference system.

Type

contributed talk

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Session Classification: Day 3