The EU is *great*!

A homogeneous stellar-parameter and astronuclear abundance pipeline

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An industrial revolution in stellar spectroscopy

15+ years ago: smaller dedicated or bigger low-resolution surveys into the Galactic halo. E.g.

- HERES targetting a few hundred r-process enhanced stars at $R = 20{,}000$ (Christlieb *et al*. 2004)
- SDSS SEGUE-1/2 targetting 360,000 thick-disk/halo stars at $R = 2{,}000$

Ten years ago: APOGEE, Gaia-ESO and (later) GALAH started to observe

1,000,000+ stars at R ≥ 20,000

The near future will see this number increase tenfold through surveys like WEAVE (@WHT, La Palma) and 4MOST (@VISTA, Chile). Plus Gaia-RVS!

Pipeline approaches

Two main approaches are taken:

- **Traditional spectroscopic pipelines** are run on larger computer clusters (trivial parallelization) using the spectra (and additional photometric or astrometric information). E.g. Gaia-ESO's parallel UVES pipelines (Smiljanic *et al*. 2014).
- **Machine-learning** is trained on sufficiently large samples of stars and subsequently applied to the full data set. Additional constraints (photmetry, astrometry) are often considered in a Bayesian approach. E.g. GALAH's 1st Data Release (Martell *et al*. 2017).

Mixed approaches exist (GAHAL's 2nd Data Release, Buder *et al*. 2018).
In an ideal world, both work and give comparable results. Clearly, both approaches have certain advantages (robustness, scalability, discovery space).

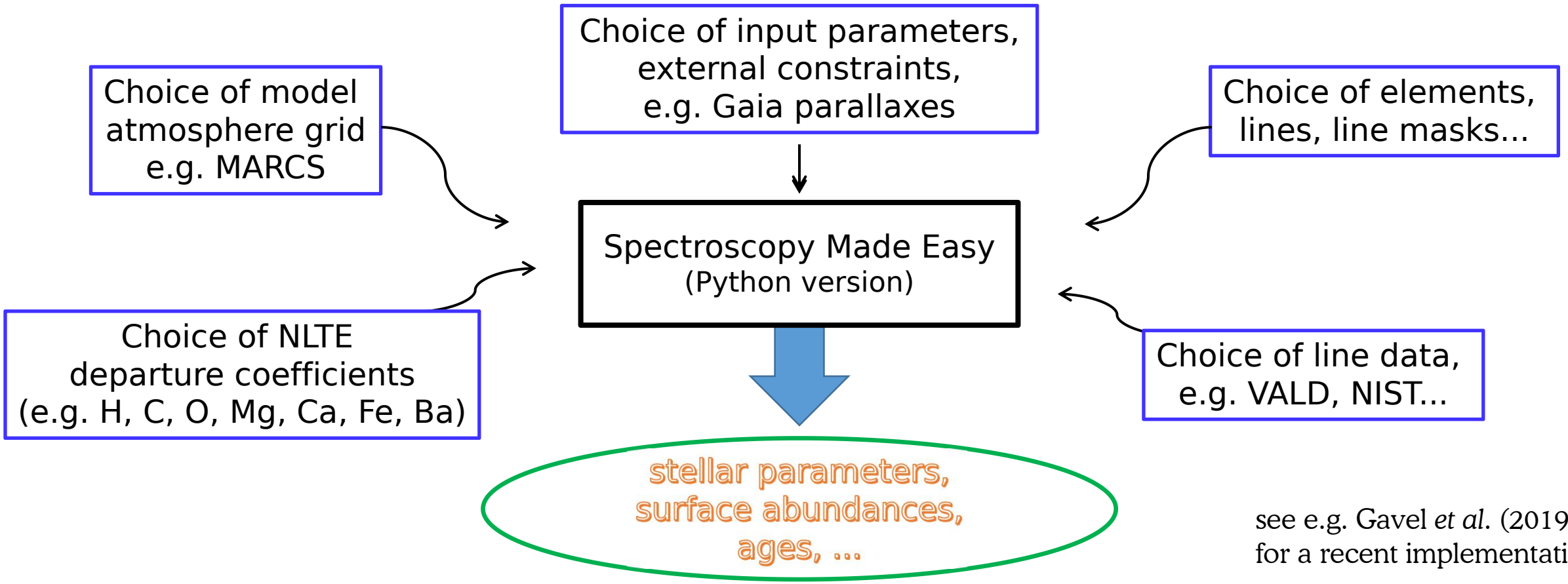
A(nother)/ChETEC-INFRA pipeline?!

Capable spectrscopic pipelines exist around Europe, but are not always open-source and/or well-documented. There is thus a knowledge threshold.

To enable the work of JRA3/WP5 Task 5.1 (see Arunas' talk), we intend to develop a **dedicated open-source pipeline** that derives 1D-based stellar parameters and relevant astronuclear abundances for the specific science cases of JRA3/WP5.

Depending on the nature of the object we decide to study and the specific abundances we want to derive, it may consider a number of sophistications like unusual atmospheric compositions (C stars), corrections for atomic diffusion (TOP stars), NLTE corrections. ⇒ Homogeneous results (ideally).

From spectrum to science: pySME



see e.g. Gavel *et al.* (2019)
for a recent implementation

We will need *your help* with any of these input packages! Do get involved!

Let's join ChETEC-INFRA forces!

While the proposers (Arunas, Gabriele, AK, plus associated partners and members of WP6) have some specific science cases in mind, we are very open to science cases that can be done with the TNA facilities ChETEC-INFRA opens up.

Please indicate your interest and expertise by writing to us!

Today's meeting is too short to dive deeply into specific ideas. But we plan to invite all scientists interested in JRA3/WP5 and NA1/WP6 for a dedicated ~half-day workshop before the summer break.