



Ground-based Observations of Gaia Benchmark and Reference Hot Stars

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Hot Stars in ESA-Gaia

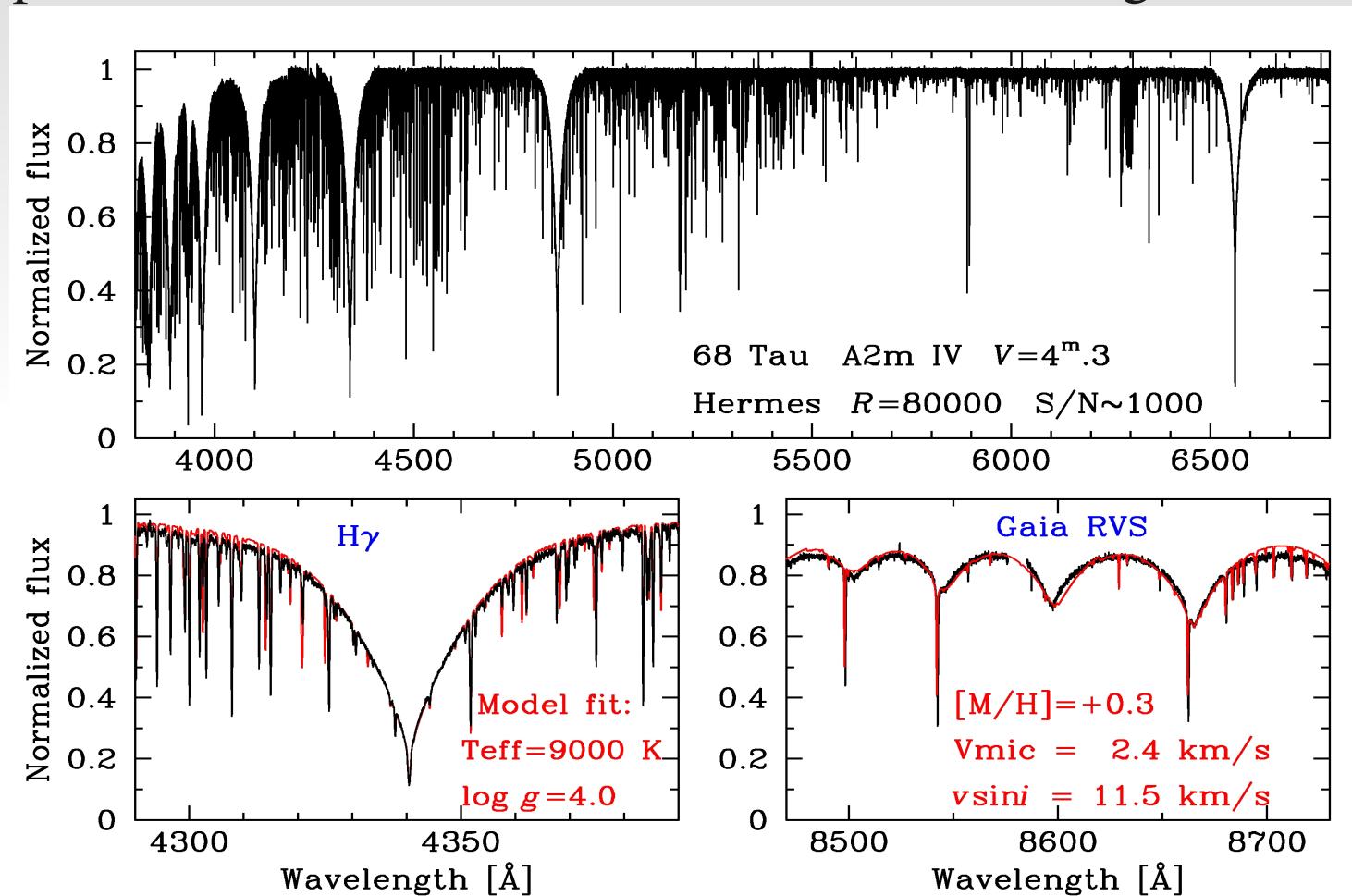
- New programme for collecting high-resolution ($R > \sim 50000$) spectroscopic observations of hot stars (OBA-type stars without emission lines).
- Required for development & training of algos for calibration of astrophysical parameters (APs) of hot stars in ESP-HS (DPAC-CU8: WP Extended Stellar Parametrizer - Hot Stars).
- Complements ongoing work for cool FGK type stars (see GSP Calibration Stars by Soubiran & Heiter in GAIA-C8-TN-LAB-CS-008-1).
- **Benchmark Stars** (BM) are bright OBA stars with well-known or tested APs for improving the quality of spectrum synthesis codes (e.g., in the Gaia-RVS).

Benchmark & Reference Hot Star Spectra

- BM stars are carefully selected narrow-lined spectra with $v\sin i < 50$ km/s.
Should cover all OBA spectral subtypes as well as possible (~20 stars).
- **4 A-type & 5 B-type** BM stars from ongoing Hermes observations (2009-).
- **5** more B & A-type BM stars from accepted Hermes programme (2012-).
- **5** O-type BM stars from new Hermes proposal (submitted Sep. 2012).
- Spectra provided in the public domain through SpectroWeb database.
- Astrophysical Parameters coverage will be completed with Hermes reference stars observations from the "Hermes filler programme" (2009-).
- **Reference stars** are bright OBA stars with $S/N > 150$ spectra including RVS
they may have shallow absorption lines ($v\sin i > 50$ km/s) because target selection
chiefly depends on lesser seeing conditions (or observations at dusk & dawn).

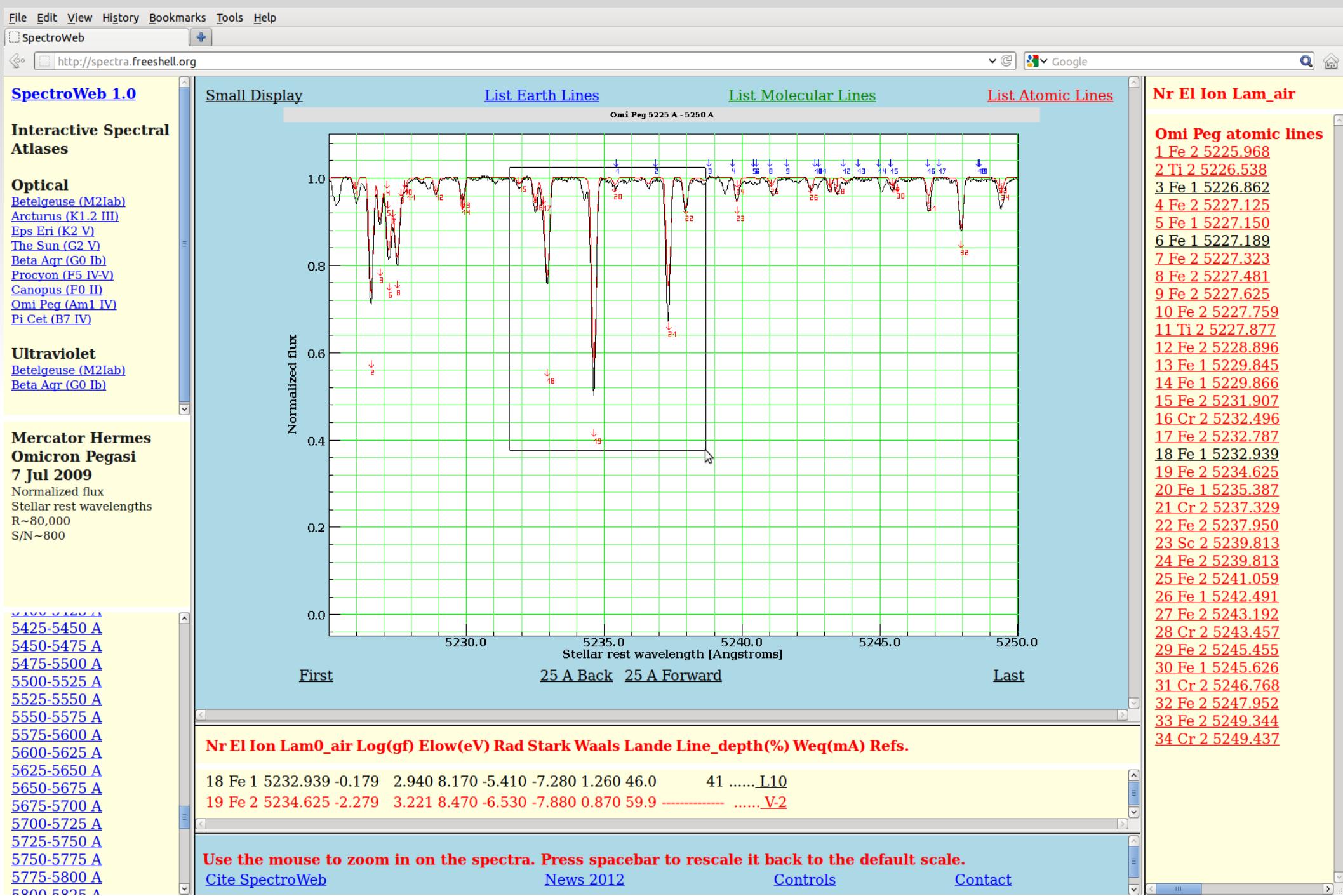
Benchmark Hot Star Spectra

- Example: Mercator-Hermes observations & modeling of 68 Tau (A2m IV)



- Hermes BM stars of $S/N \sim 1000$ require several hours of integration time.

Example: SpectroWeb online spectrum of benchmark A1 star Omi Peg



Reference Hot Star Spectra

- Mercator-Hermes reference spectra including the Gaia-RVS domain.
- "Filler Programme" observations started in 2009, and target 2194 objects of $V < 8^m.5$. PIs: P. Royer (KU Leuven) & A. Lobel (ROB).
- There are 226 A stars, 183 B stars, and 12 O stars, or 421 OBA stars currently observed (Sep. 2012).
- Target SNR typically $>\sim 150$ from repeated observations, if needed.
- Ongoing development of future data archive: [HHighRespect database](#) (will come online late 2014).
- Provide uniform set of normalized spectra; HHighRespect offers individual spectra and/or epoch co-added for largest SNR.
- Filler Programme aims for uniform coverage of all spectral subtypes and luminosity classes of O, B, and A-type stars.

Benchmark & Reference Hot Stars

- Some Mercator-Hermes sample spectra including the Gaia-RVS region

