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Is telluric correction required for precise radial velocities?

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Stellar spectra are polluted with the absorption lines produced by the Earth's atmosphere. Earlier modeling work showed that a perfect telluric correction increases the radial velocity precision compared to masking the regions affected by telluric absorption. But what is the case for real observations? With CARMENES near-infrared spectra, I will show the impact of the telluric correction on the radial velocity precision effectively derived, before and after telluric correction using the synthetic transmission method Molecfit. I will discuss the advantages and limitations of the synthetic transmission methods. Finally, with ESPRESSO data, I will show the impact of the correction methods on the micro-telluric lines ($< 2\%$) and their possible improvements.

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