

Next Generation Stellar Population Models with IRTF

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With help from
Andrew Mann,
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and the IRTF staff

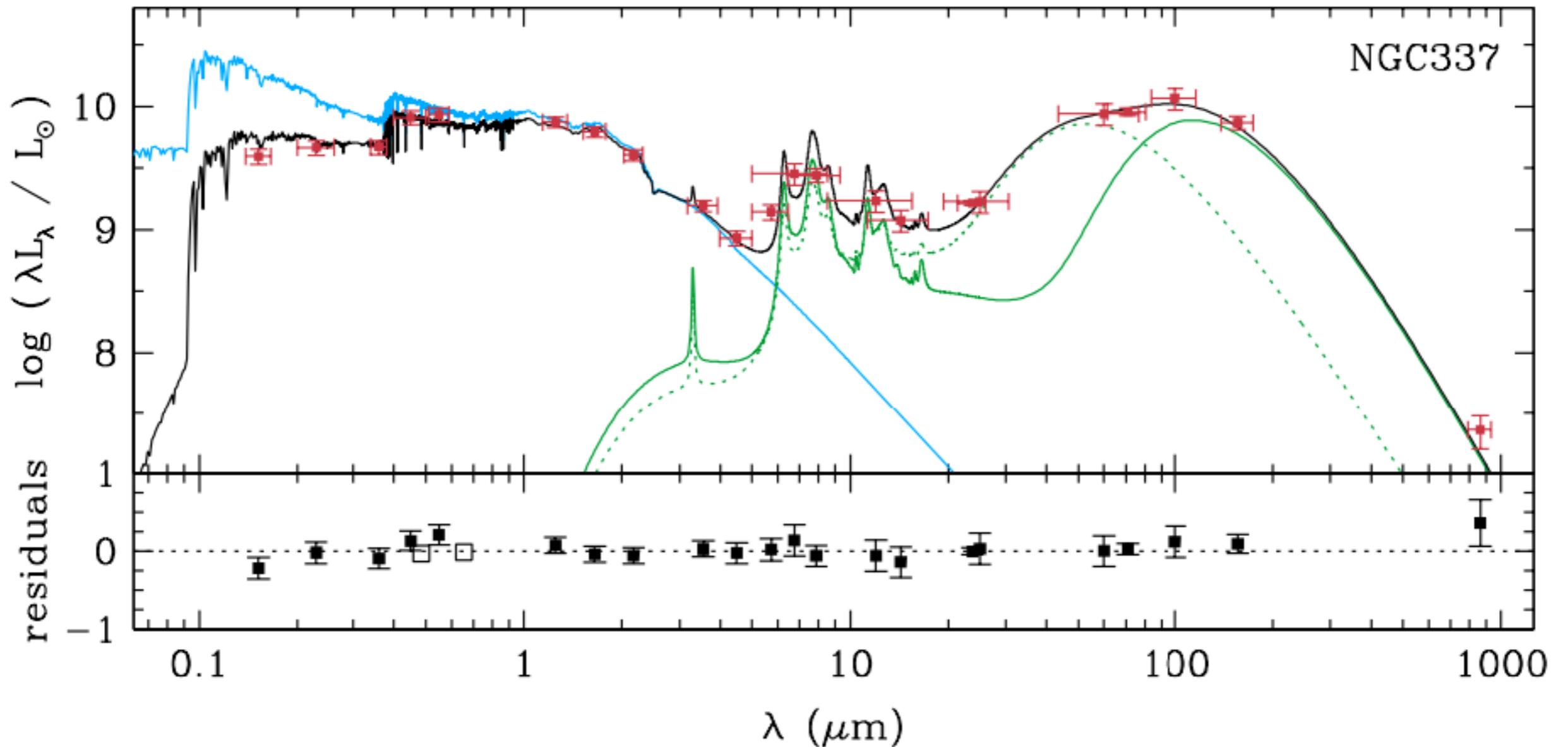


**Graduate
Research
Fellowship
Program**



Stellar mass, metallicity, SFH, IMF

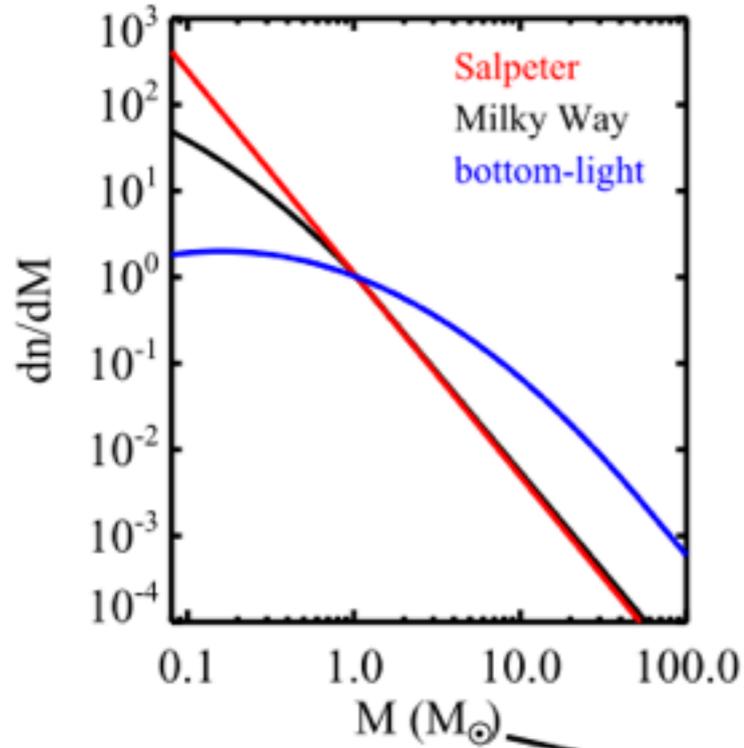
Dust and gas



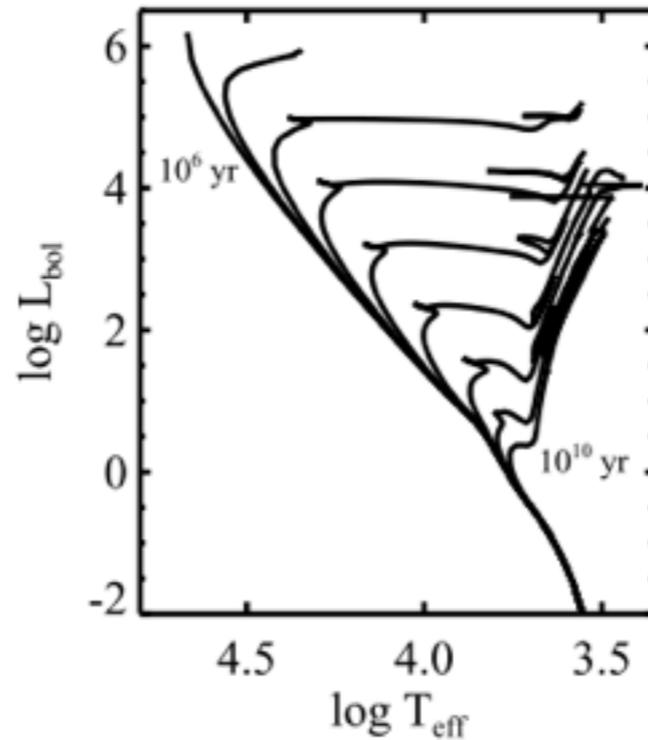
SPS models are the foundation of modern understanding of galaxy formation and evolution

de Cunha, Charlot, & Elbaz 2008

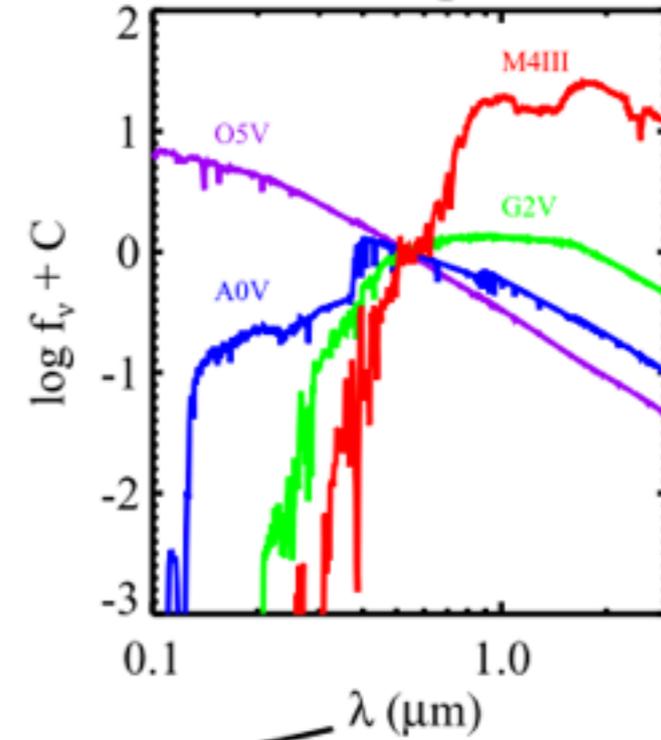
IMF



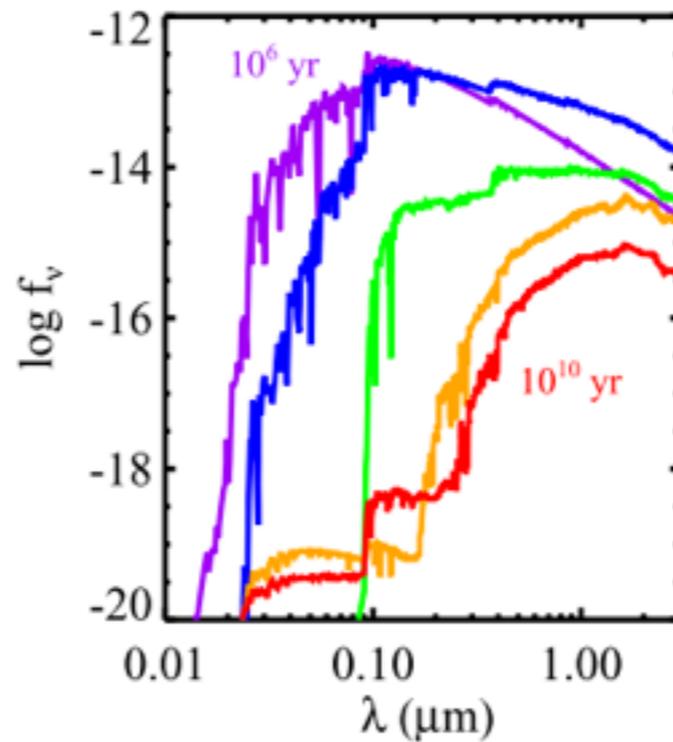
Isochrones



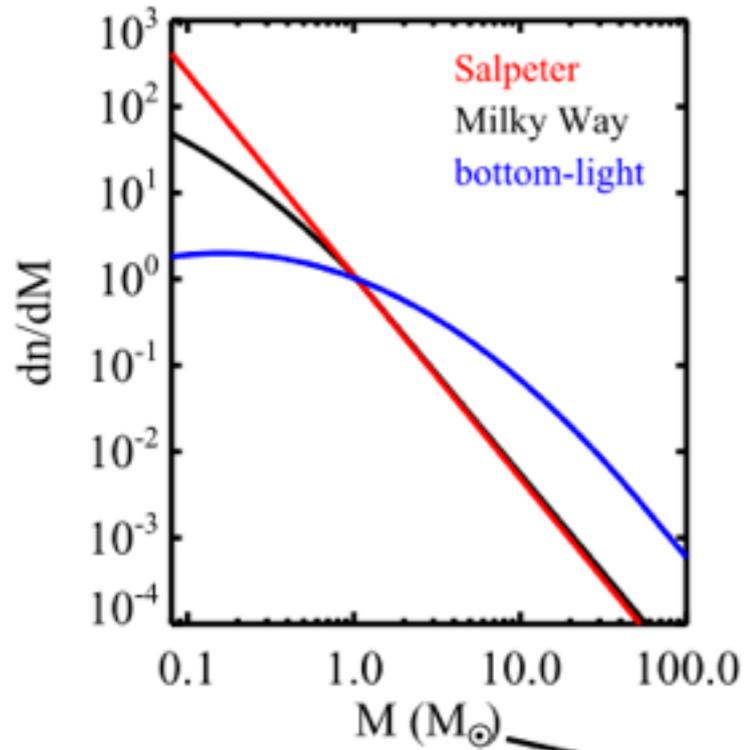
Stellar Libraries



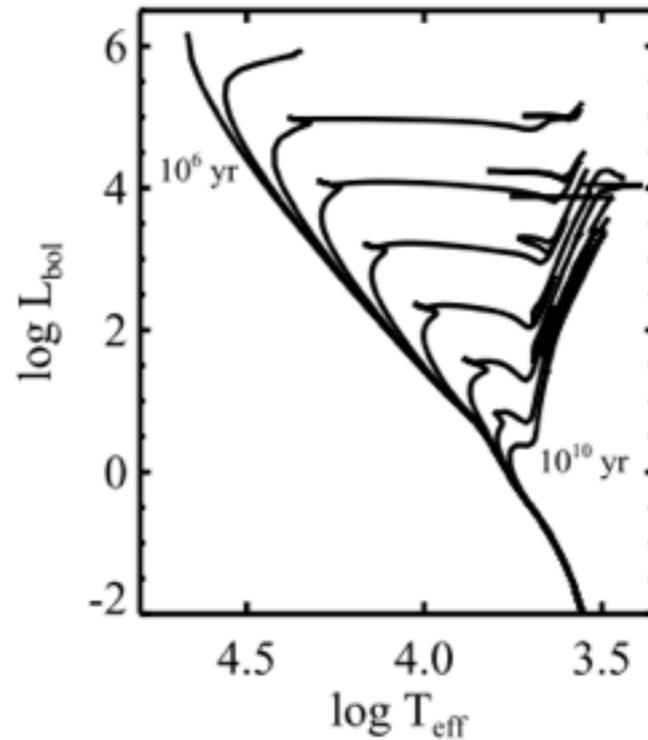
**Stellar libraries
are crucial
components to
SPS models**



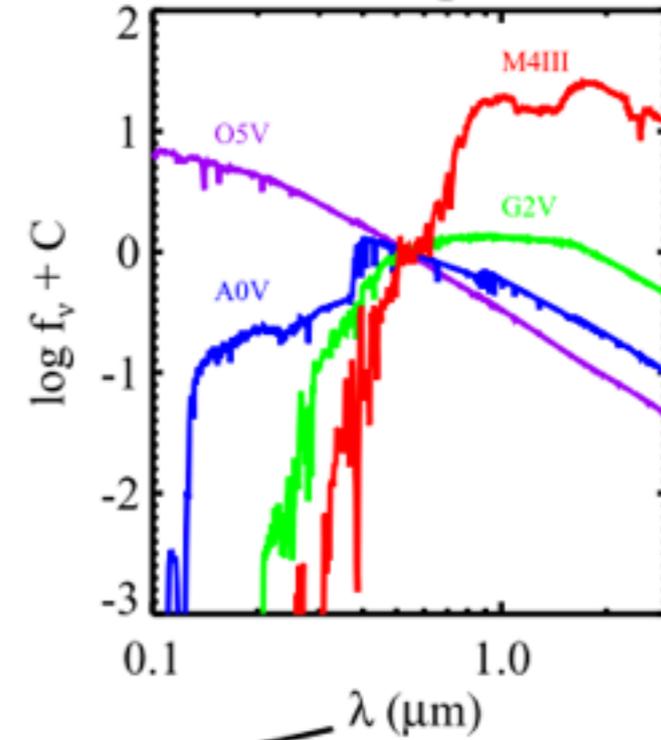
IMF



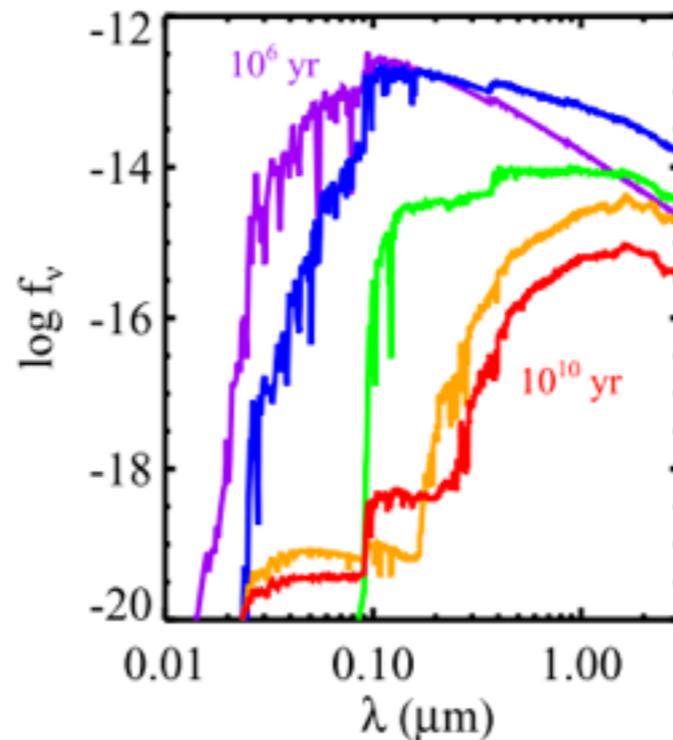
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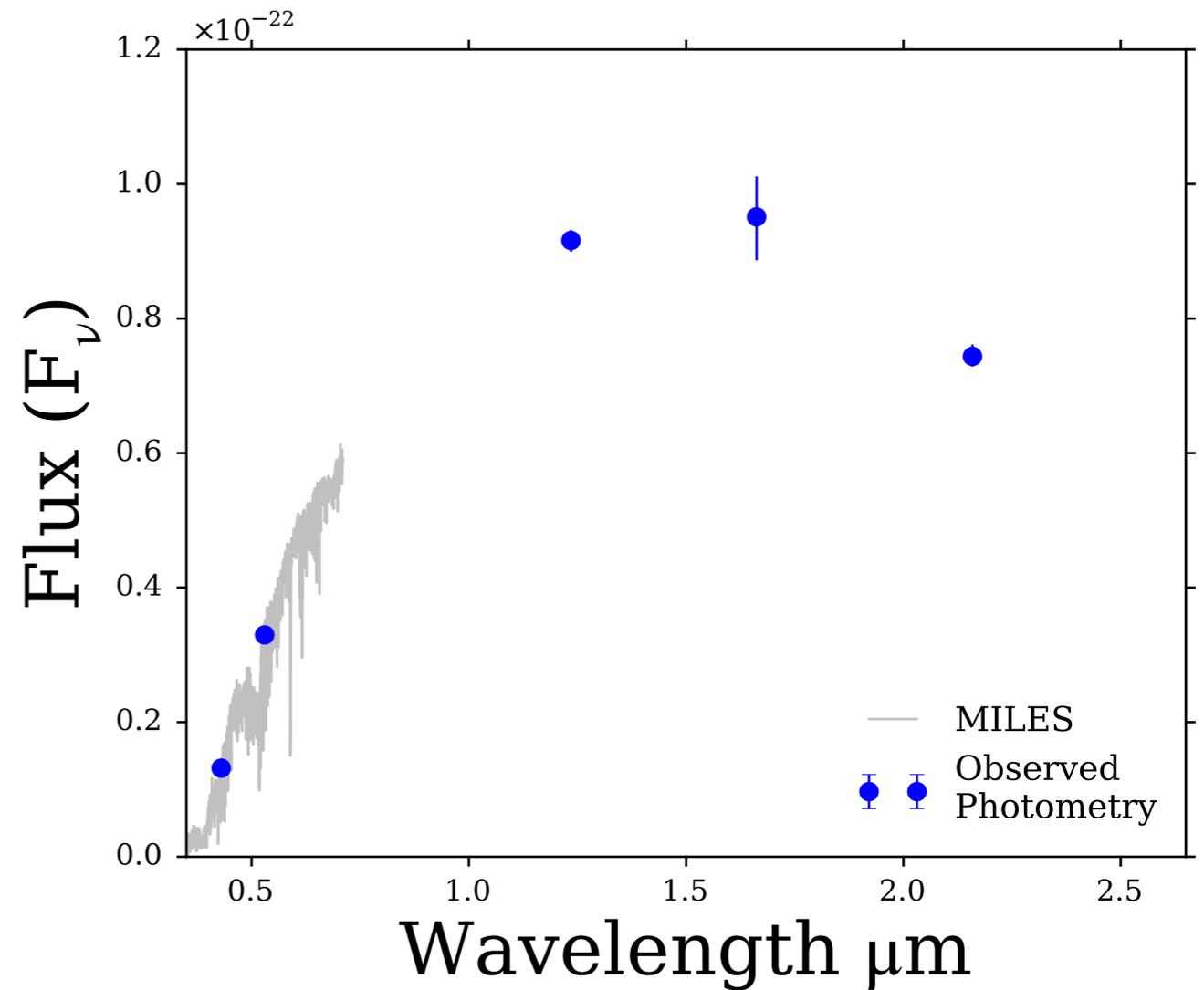
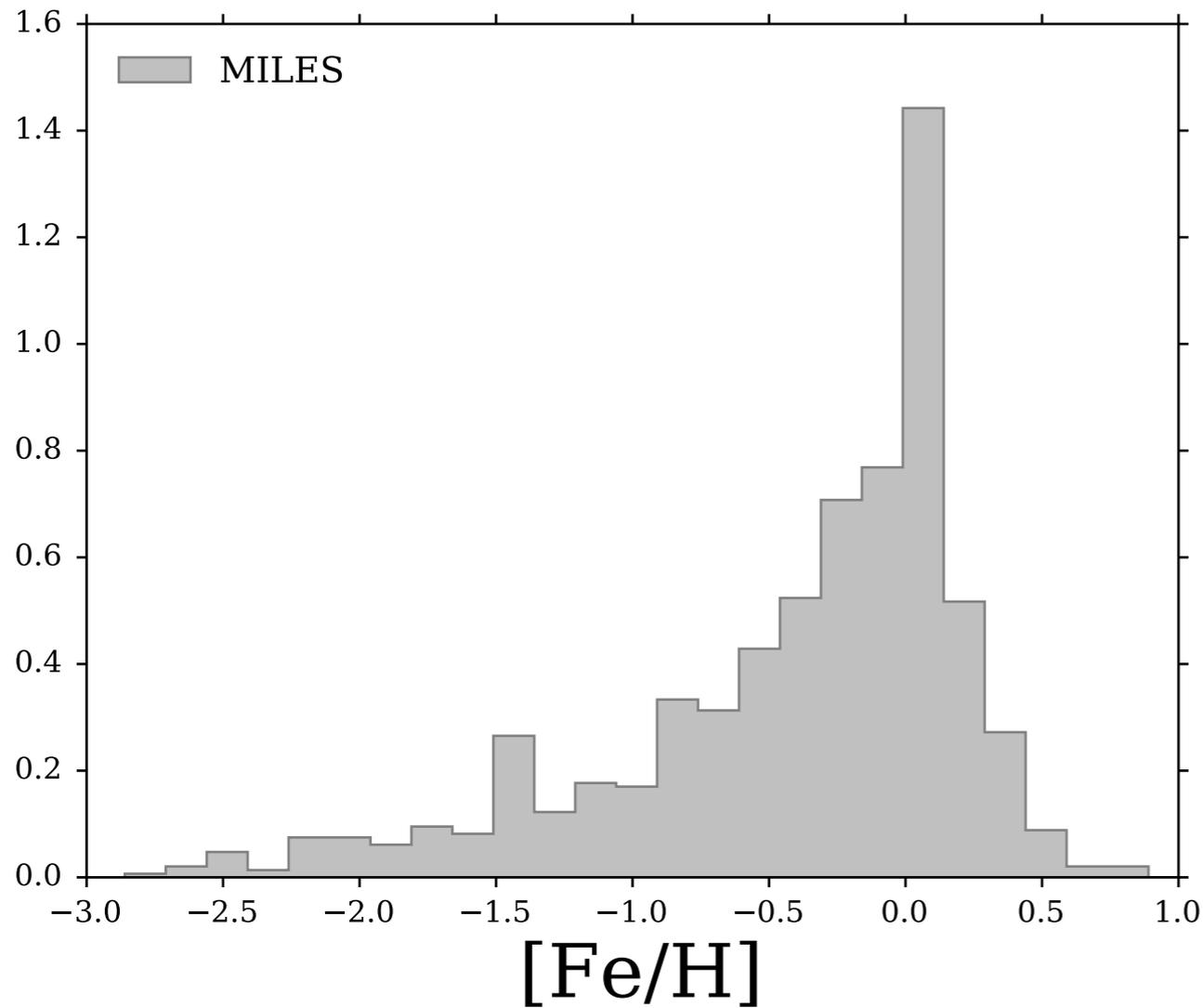
Stellar Libraries



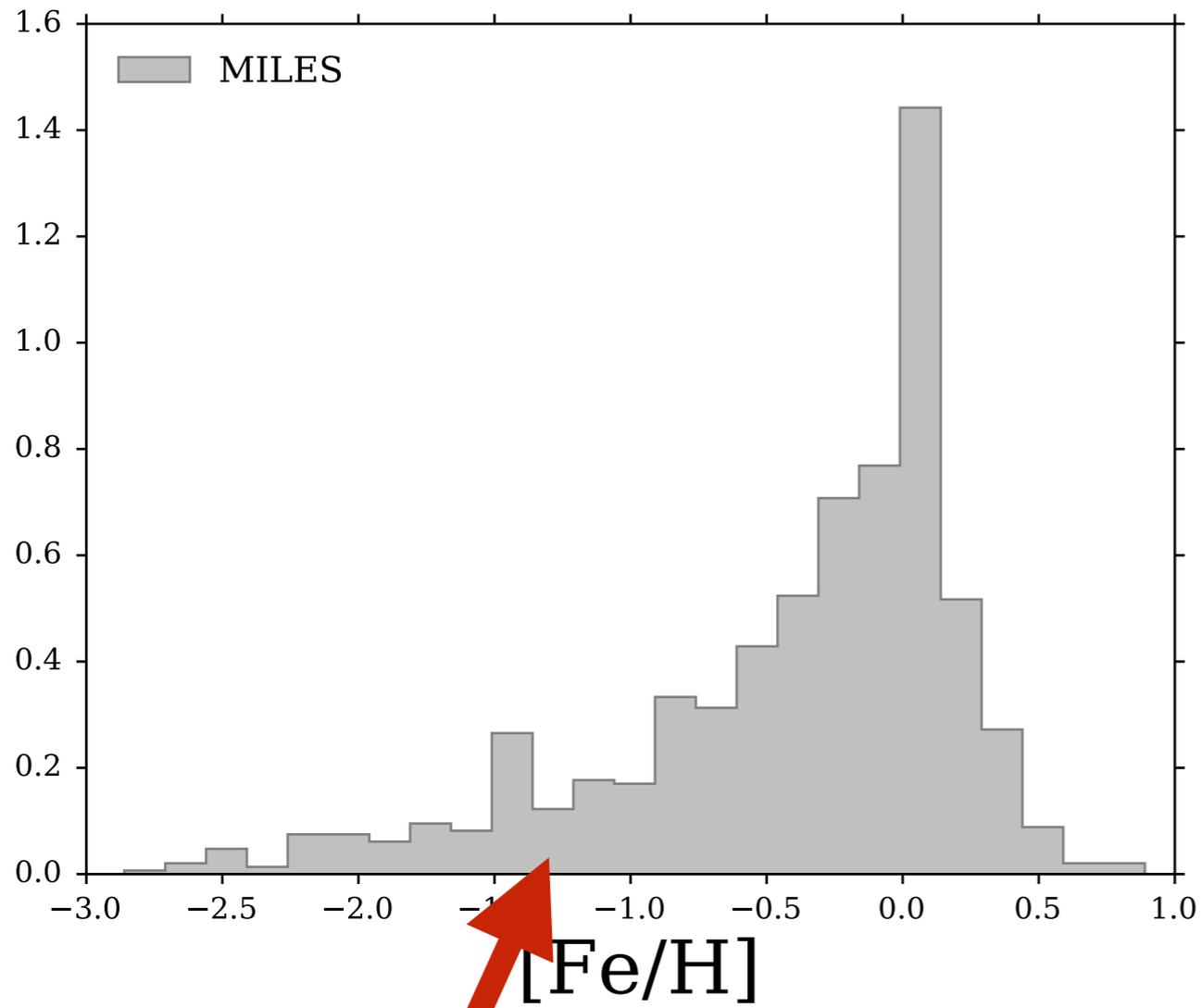
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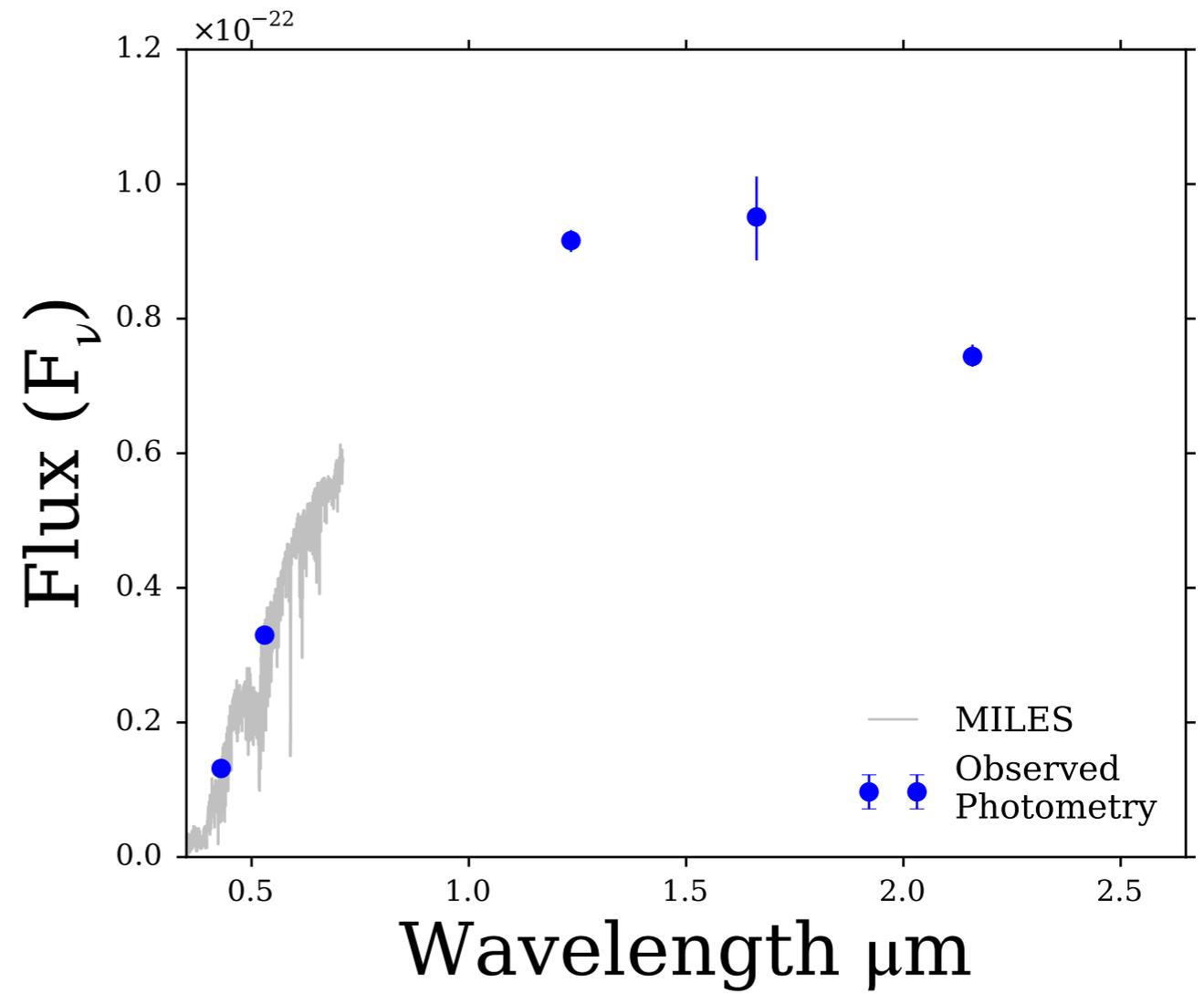
**... and so are the
main limitation in
the scope of SPS
models**

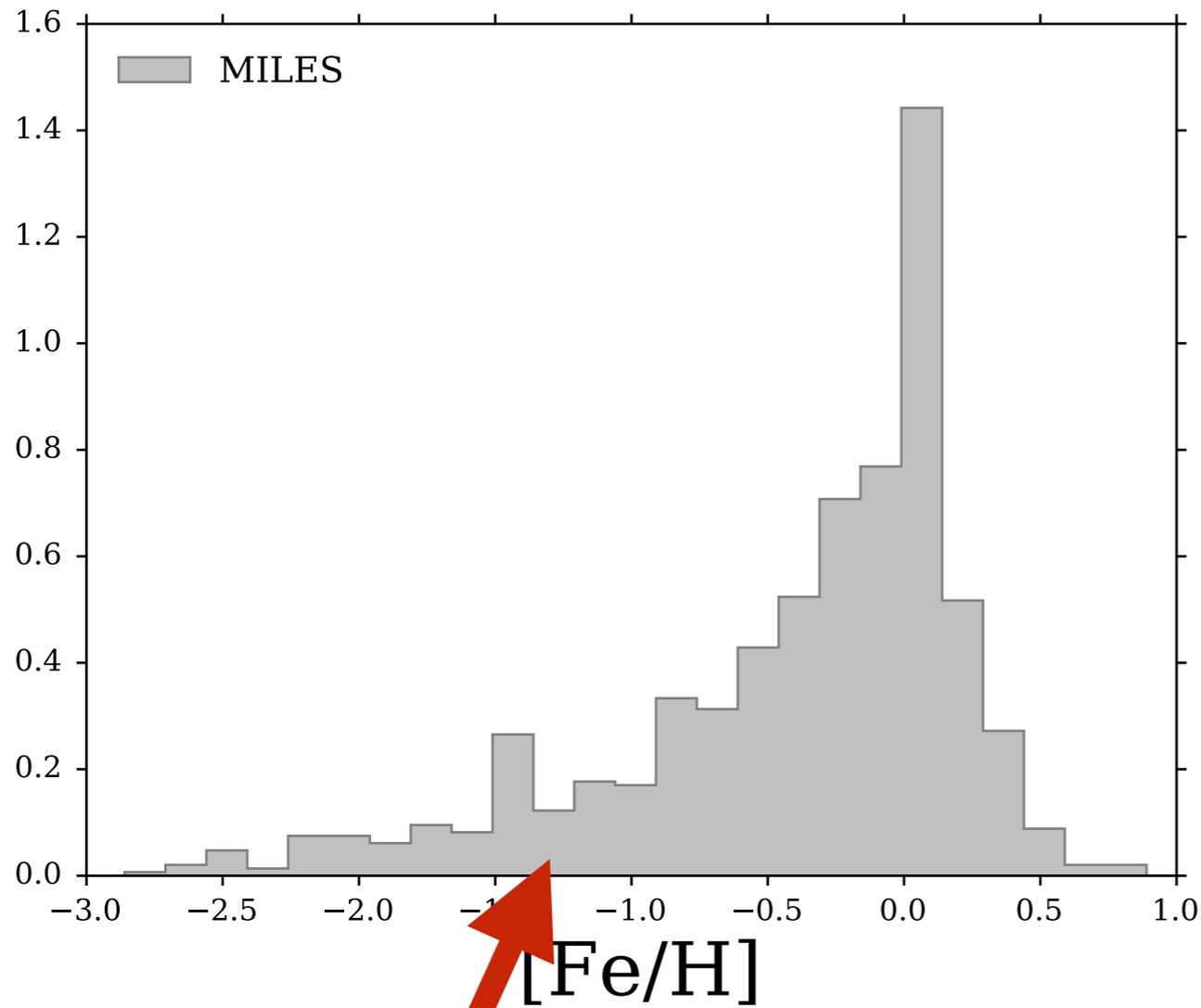


Stellar libraries strive to be as complete in **stellar parameter and **wavelength** coverage as possible**

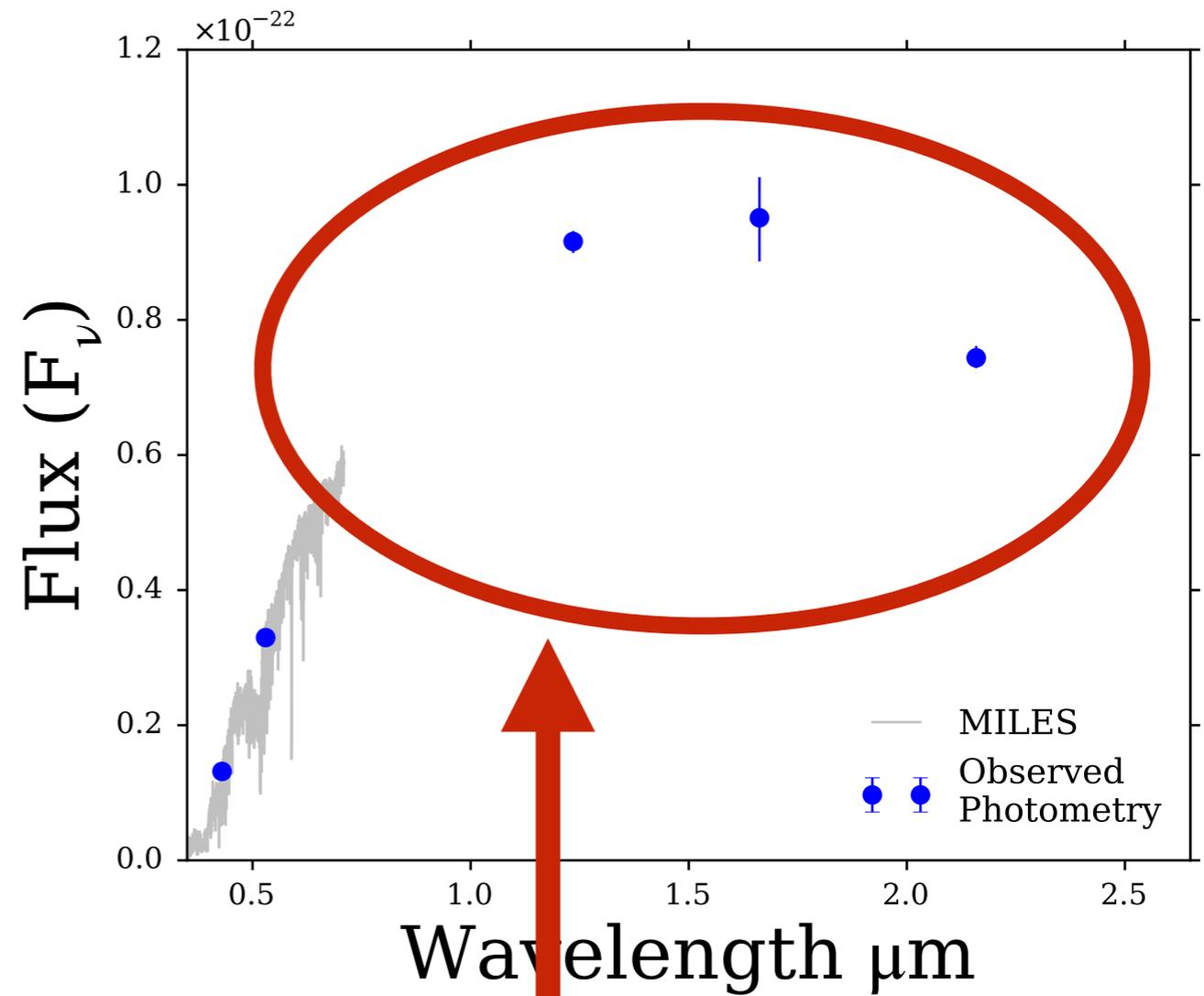


**Optical stellar libraries
have extensive stellar
parameter coverage**

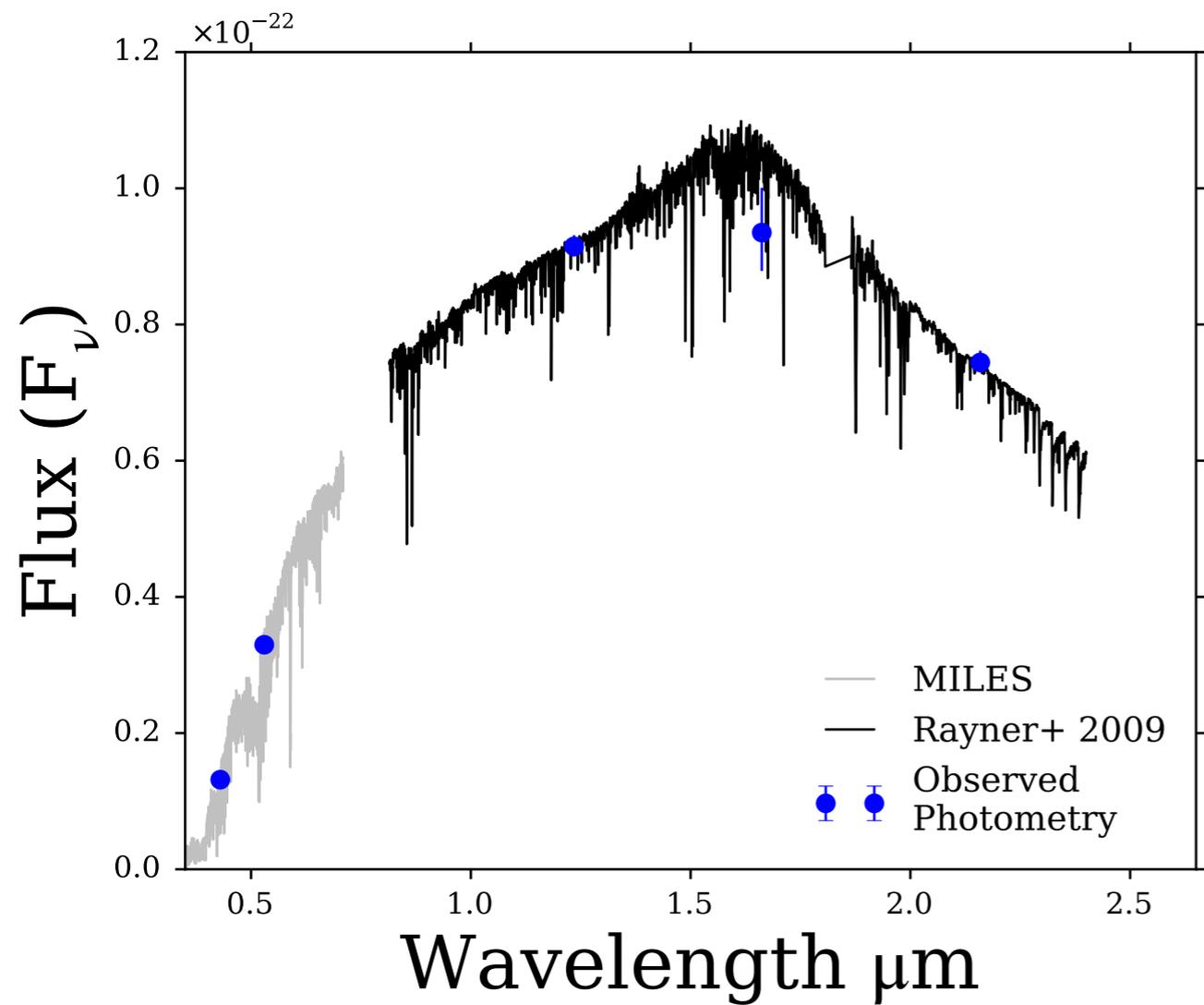




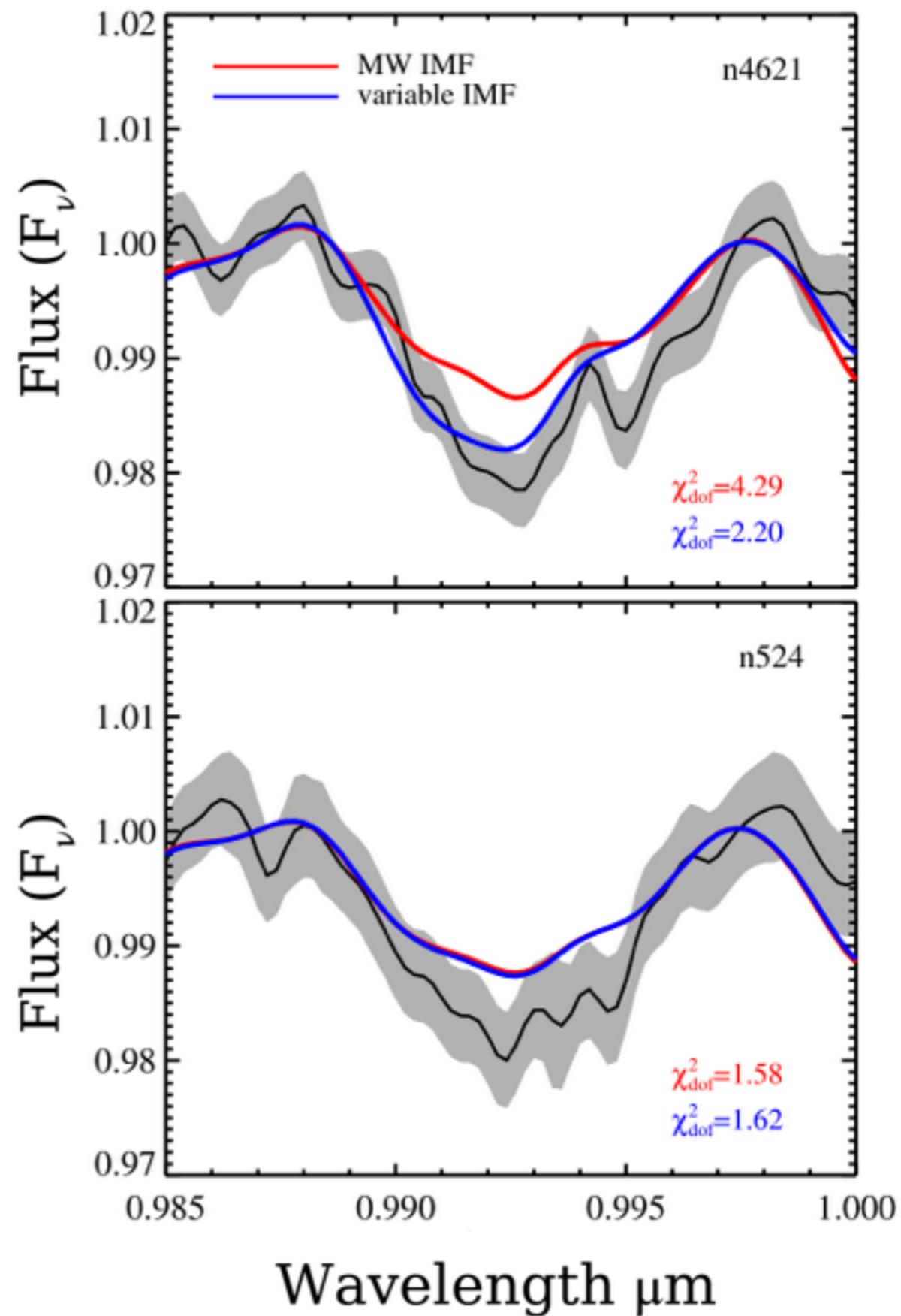
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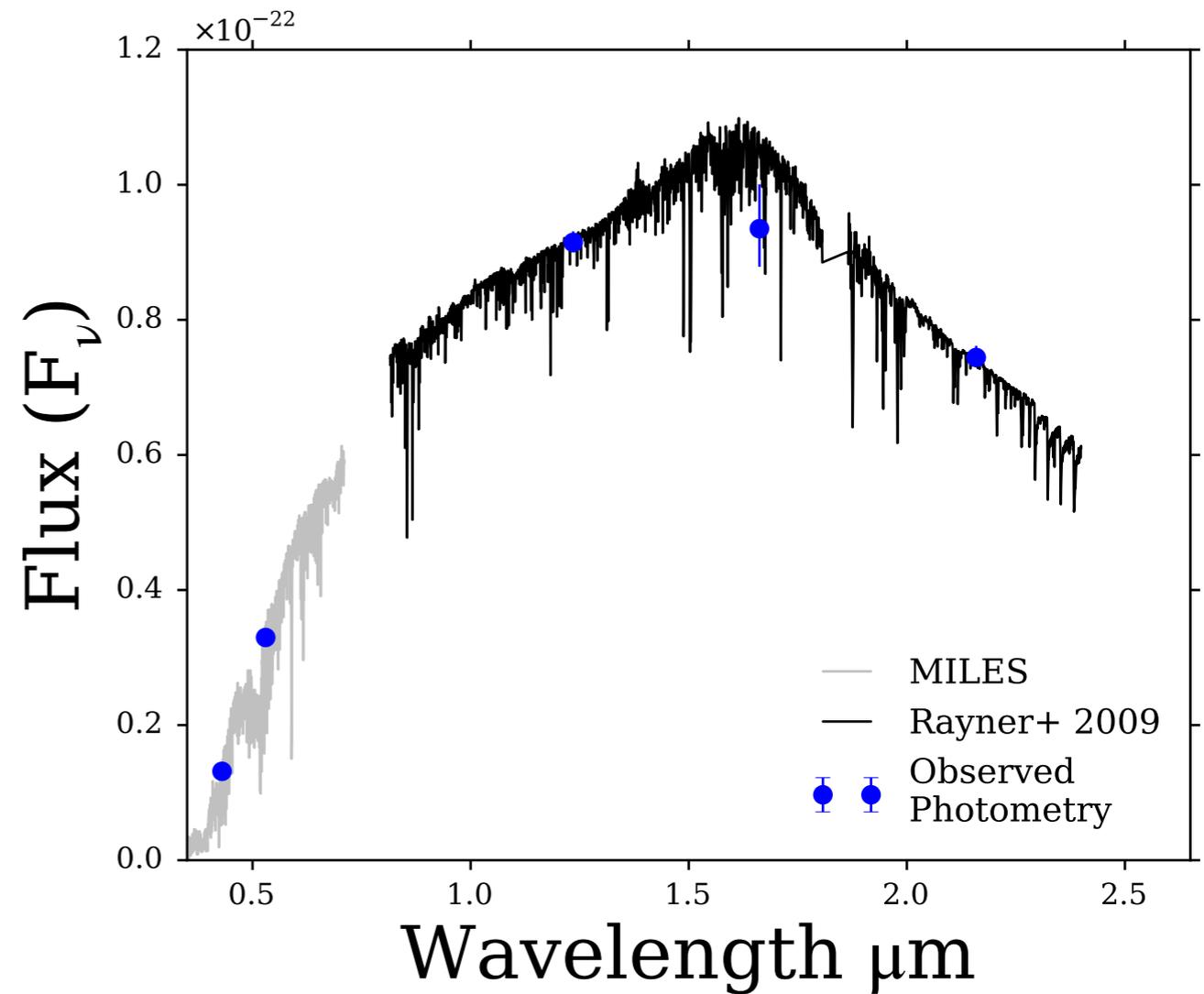
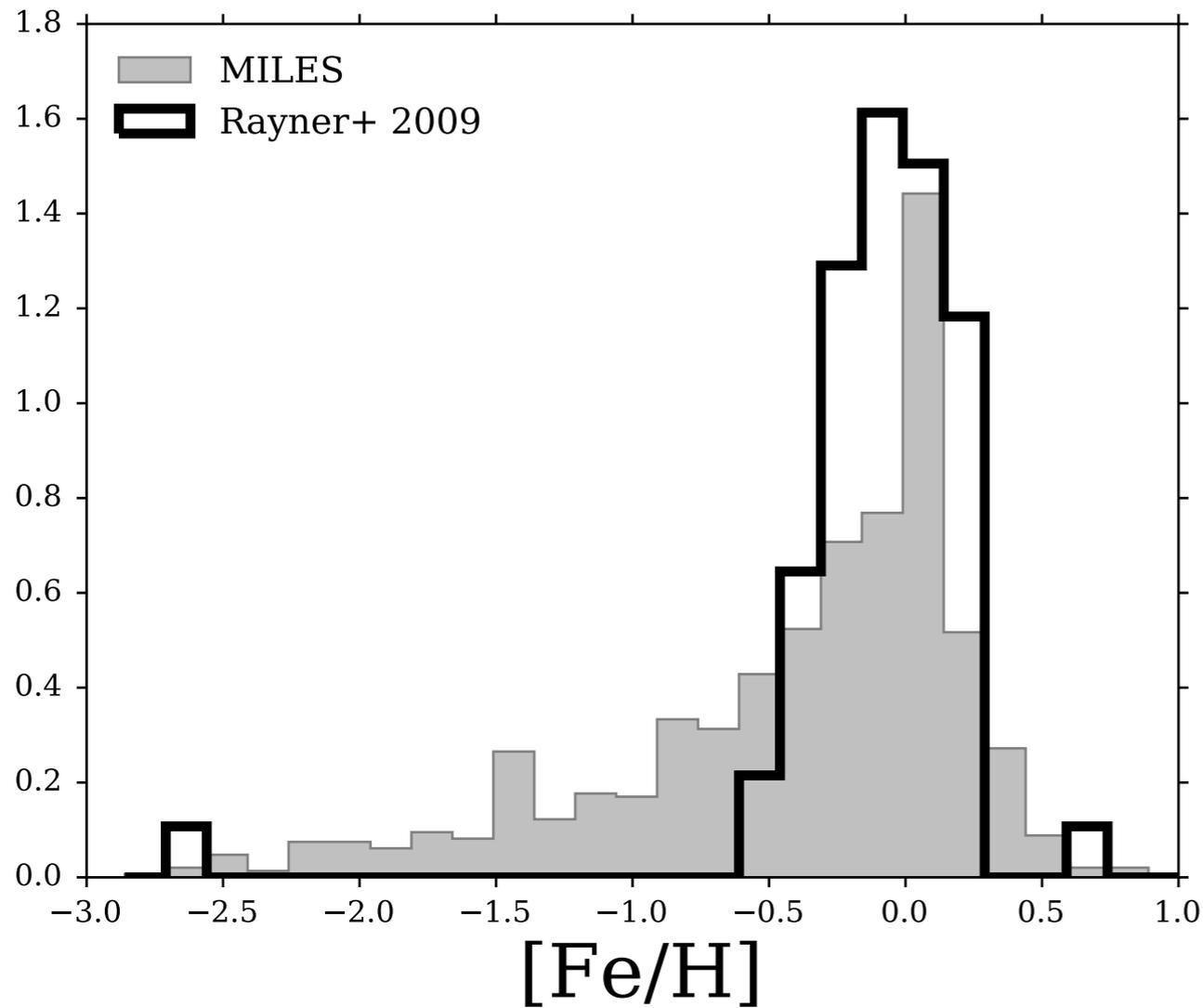
**But amazing things are
happening in the NIR!**



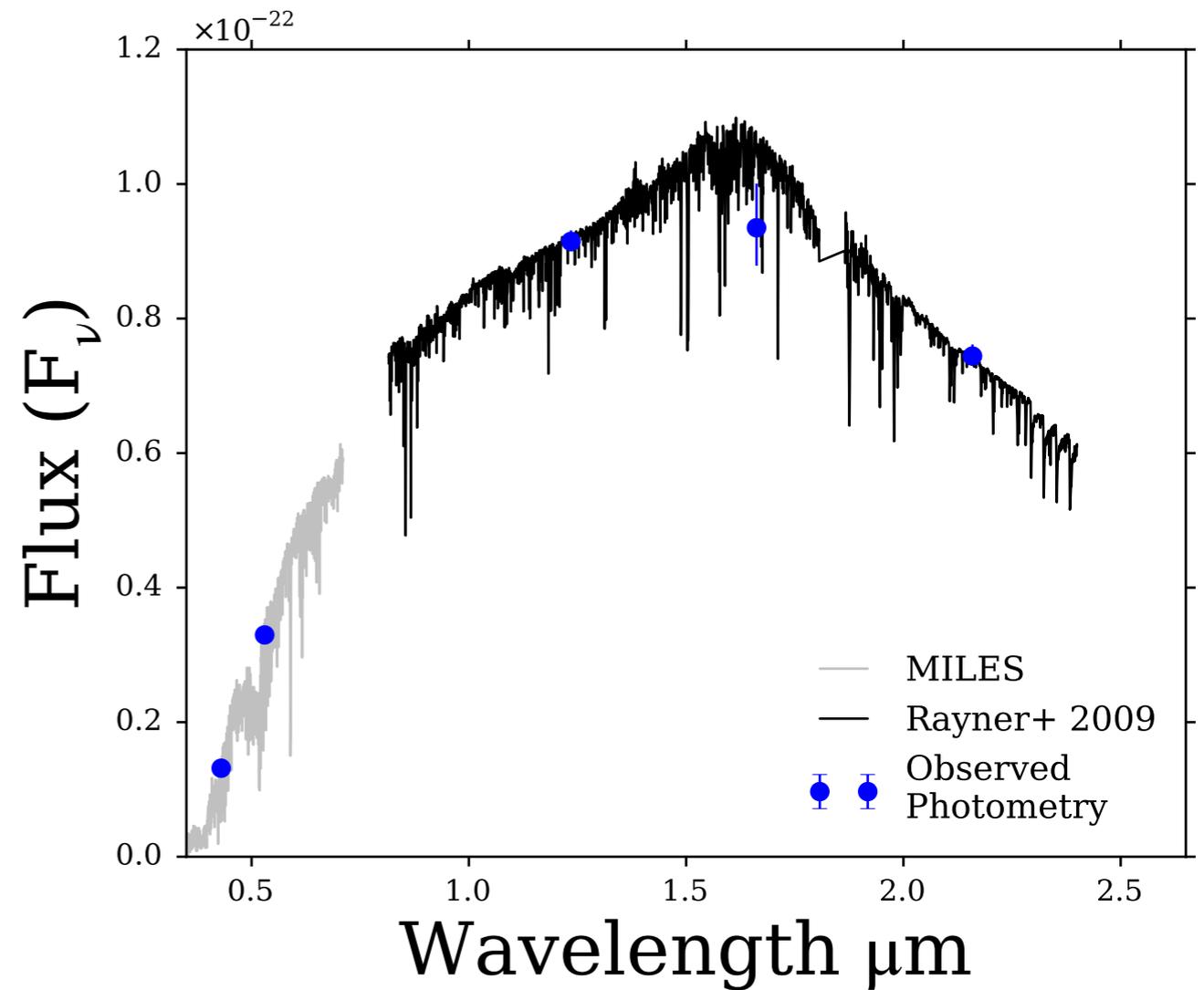
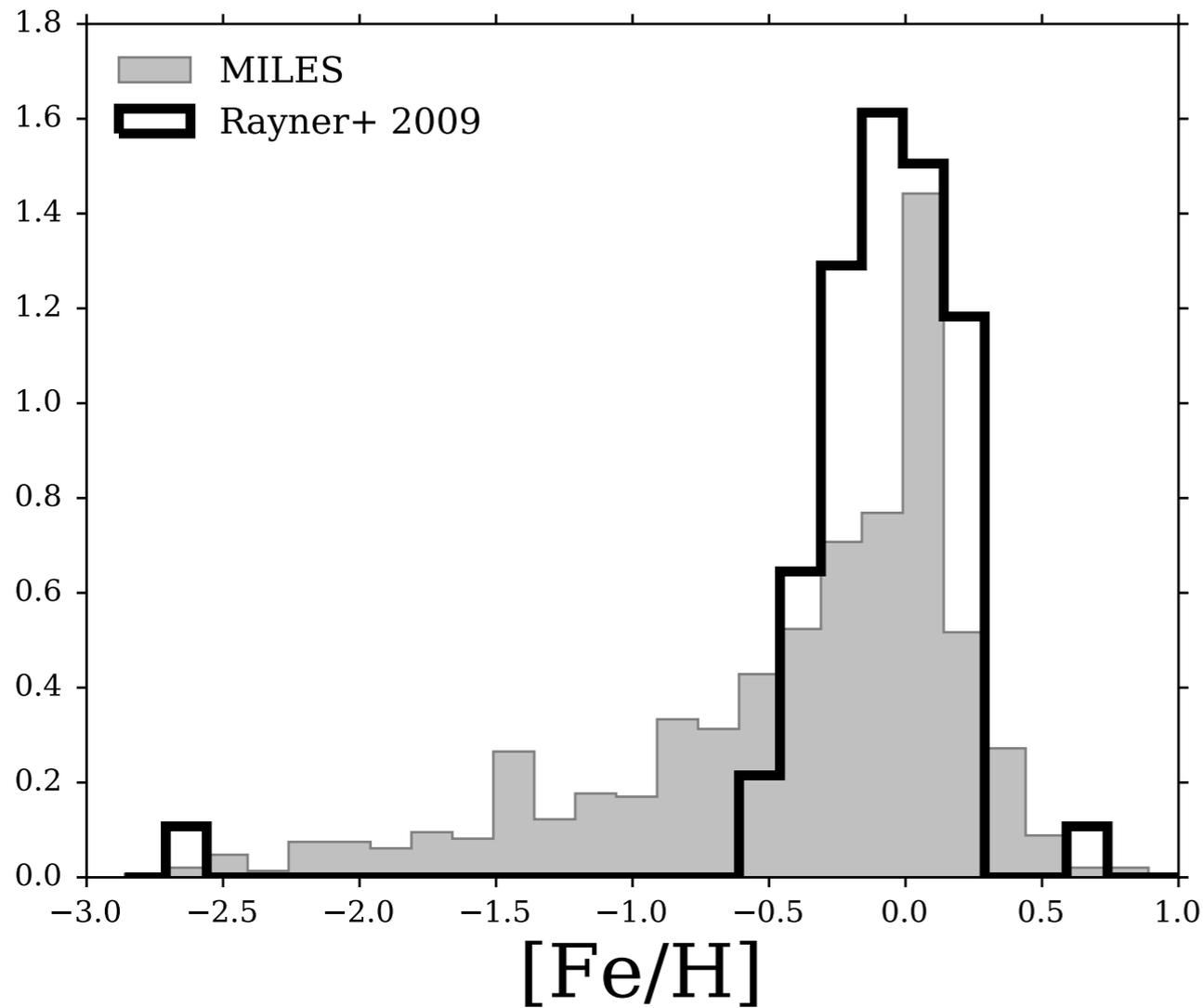
**IRTF stellar library
enabled significant
progress in our
understanding of
galaxies**



Conroy & van Dokkum 2012

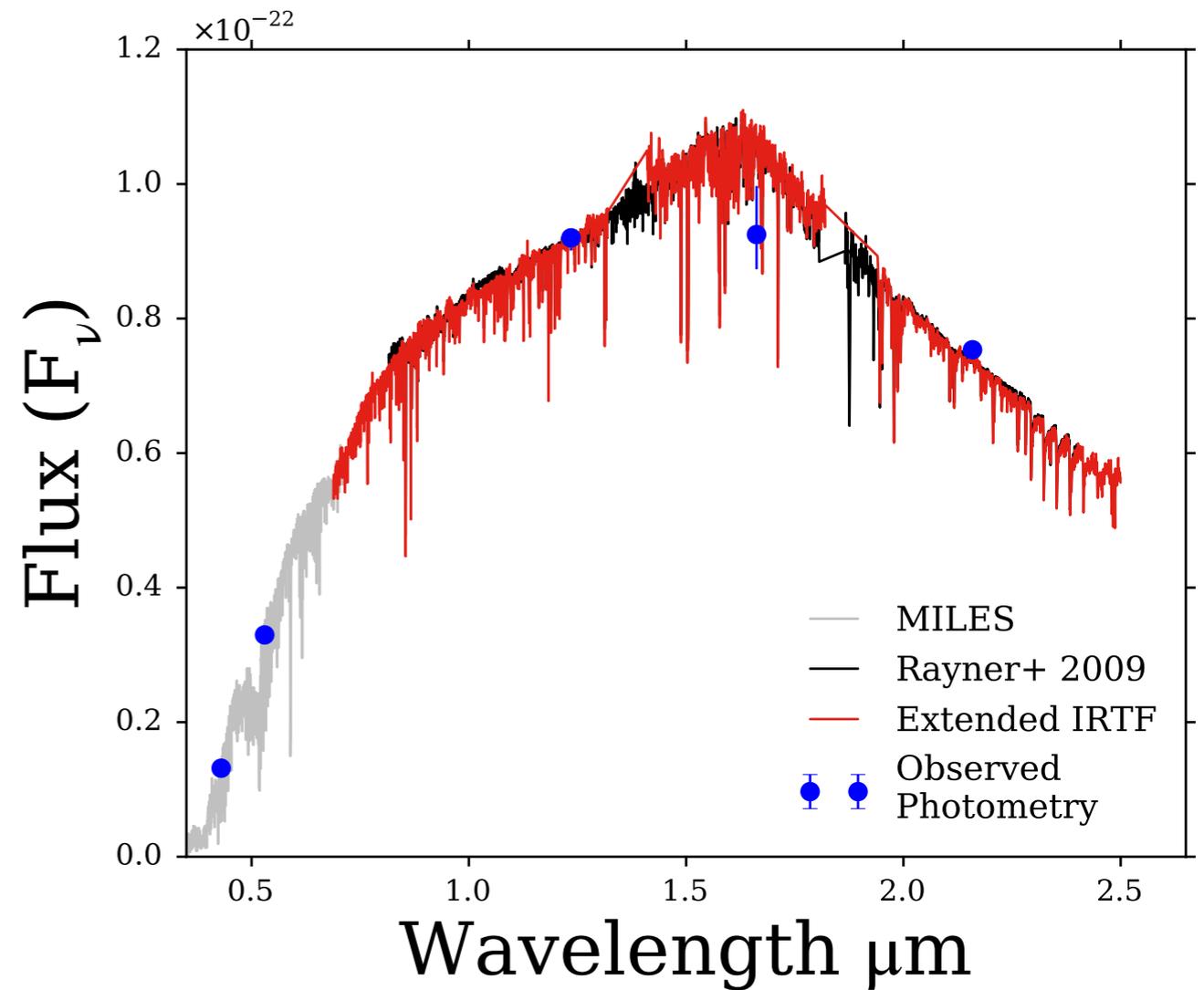
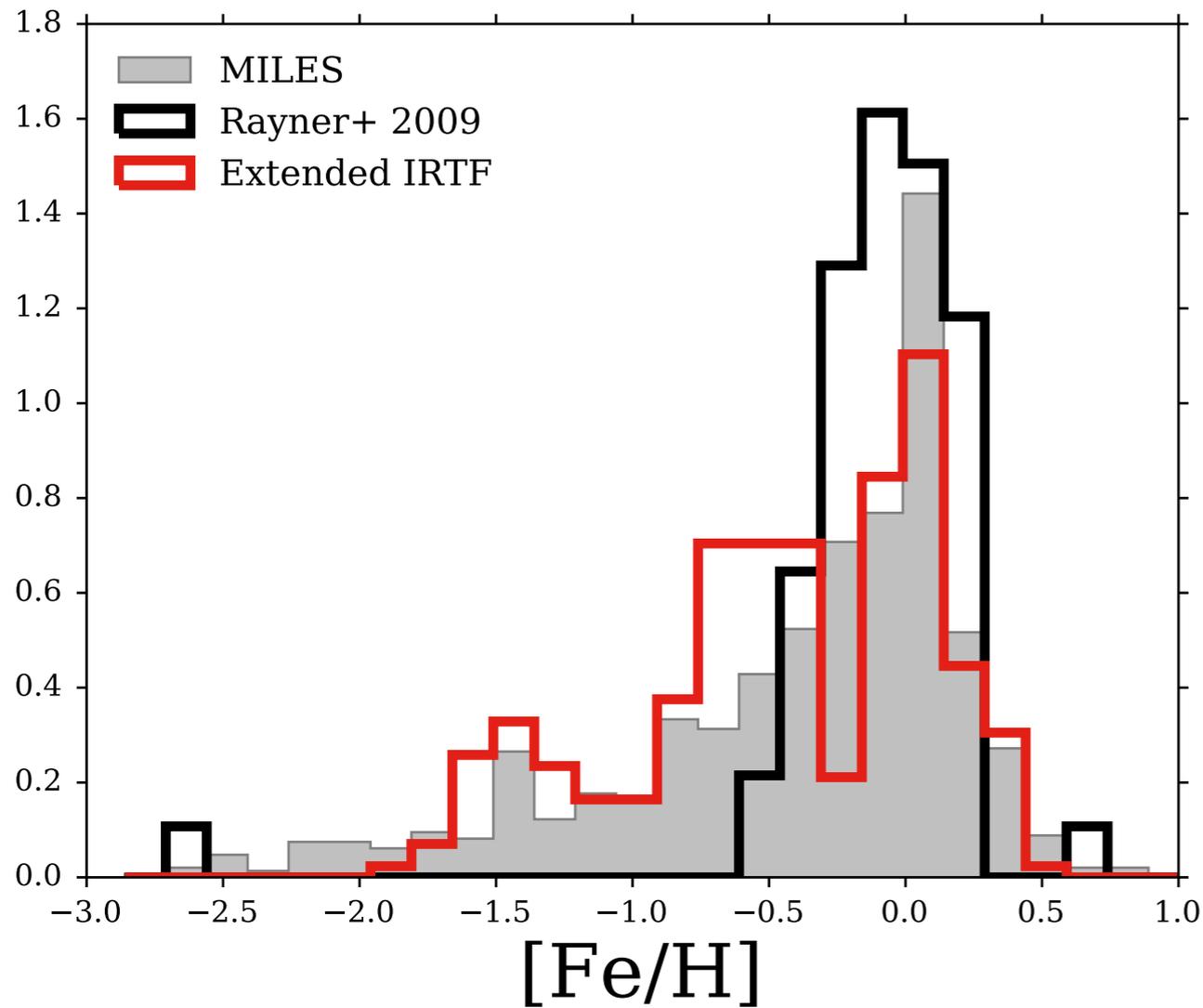


Original IRTF library had limited stellar parameter coverage



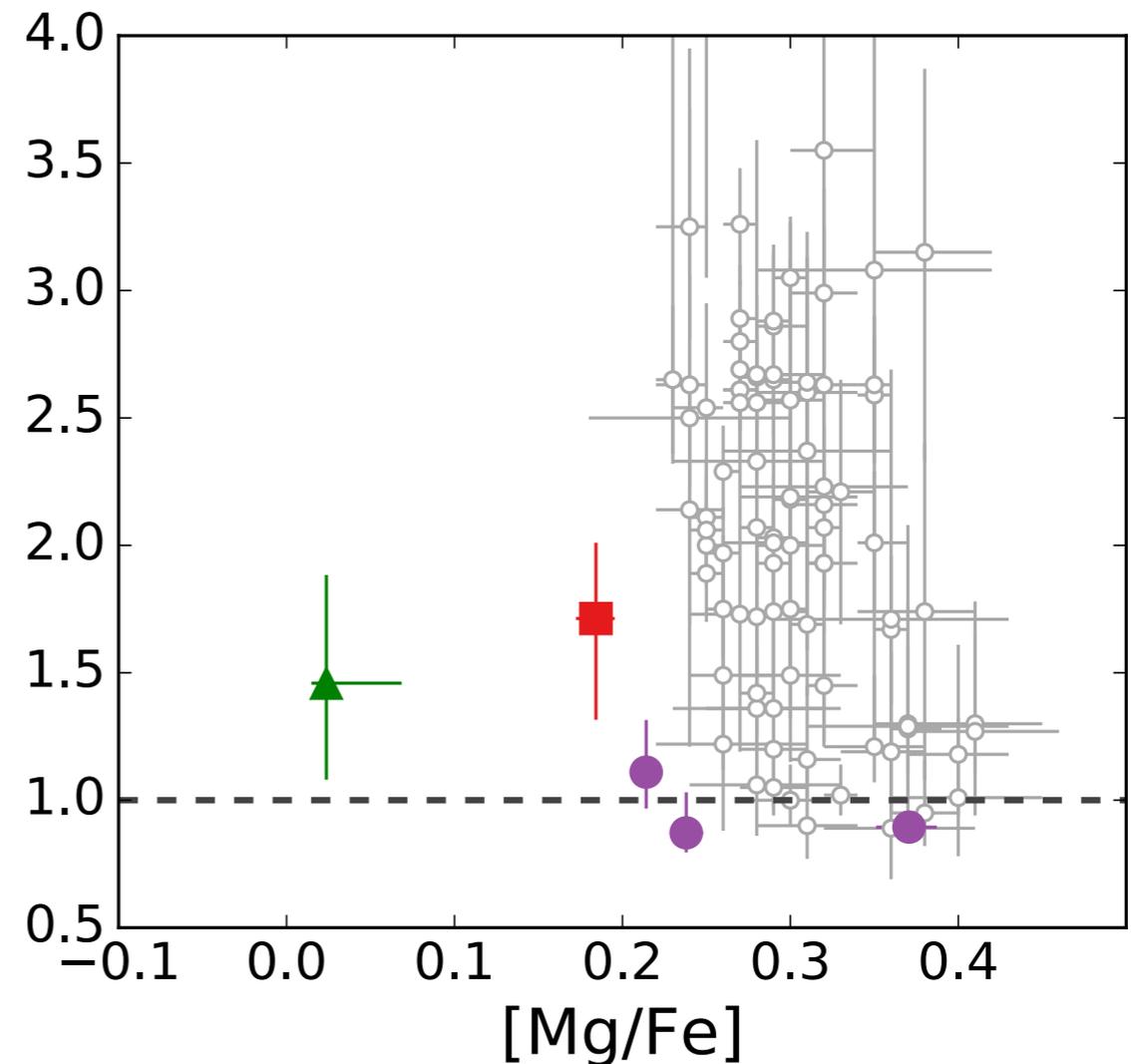
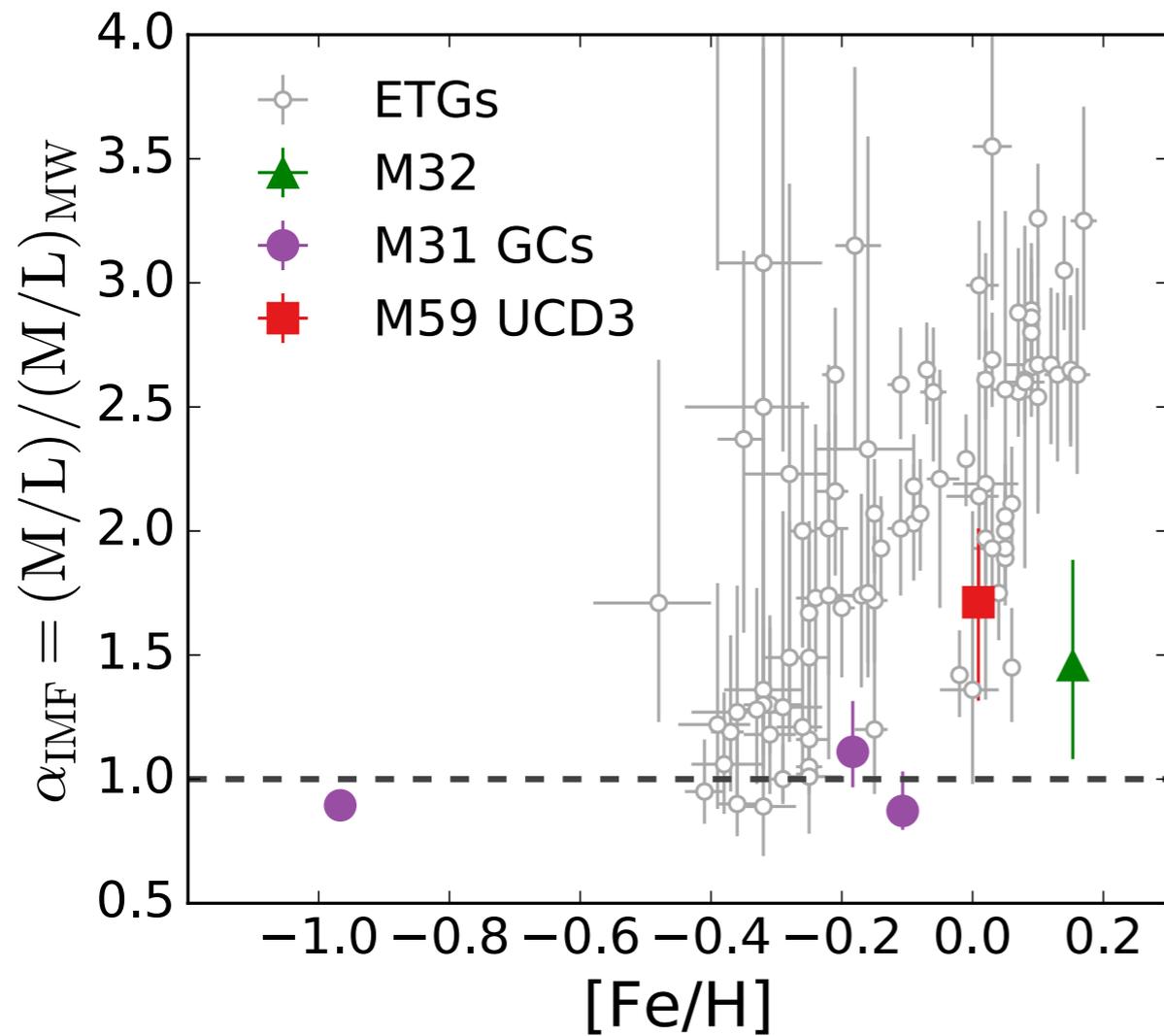
Original IRTF library had limited stellar parameter coverage

Most extragalactic stellar populations are less than solar metallicity!

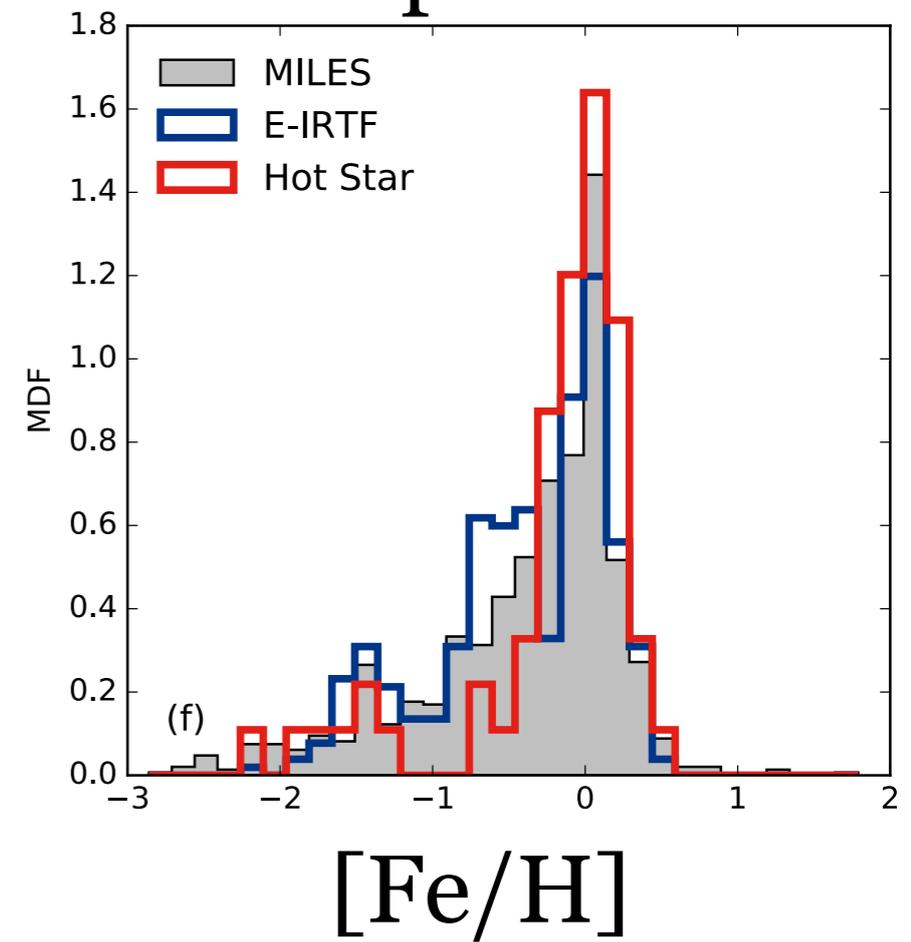
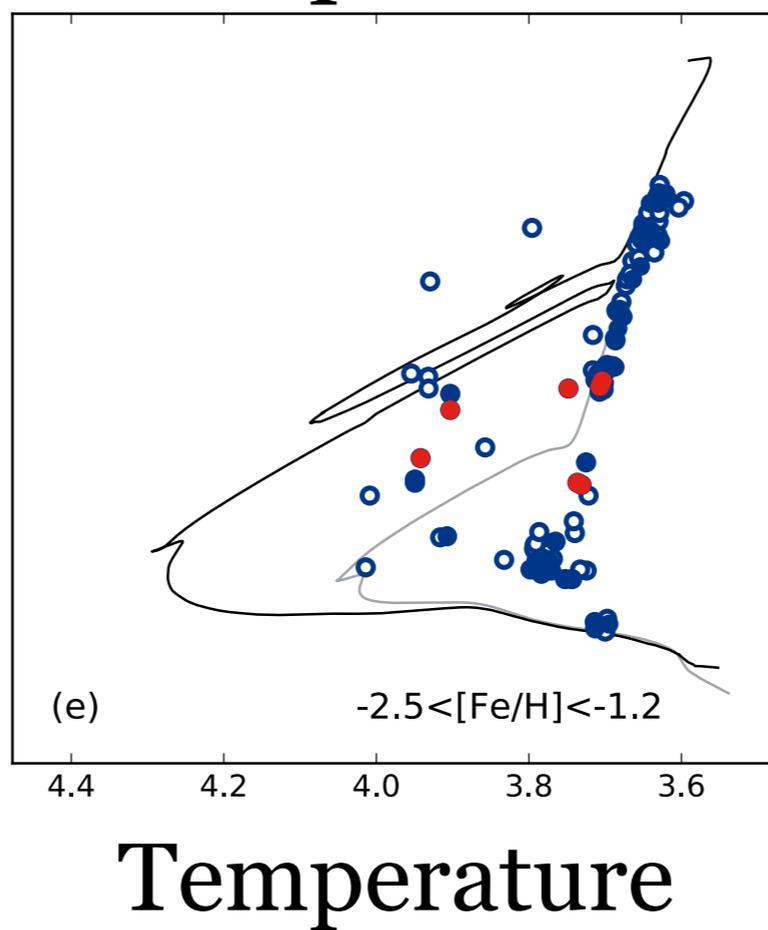
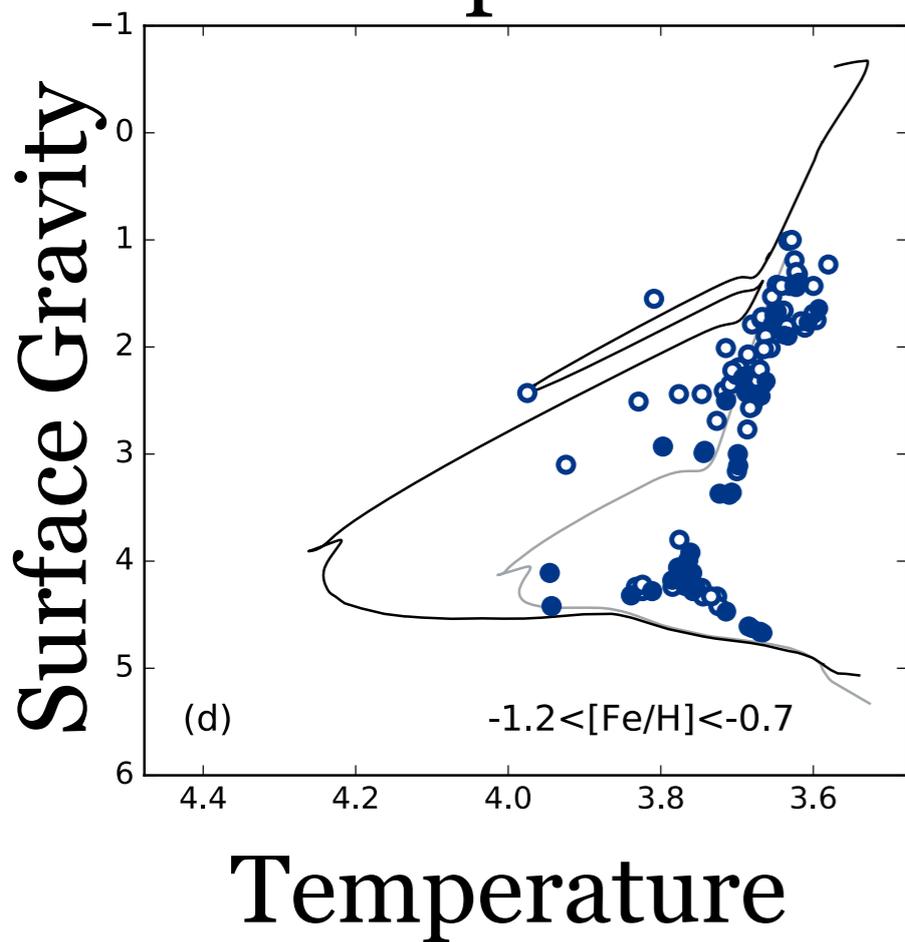
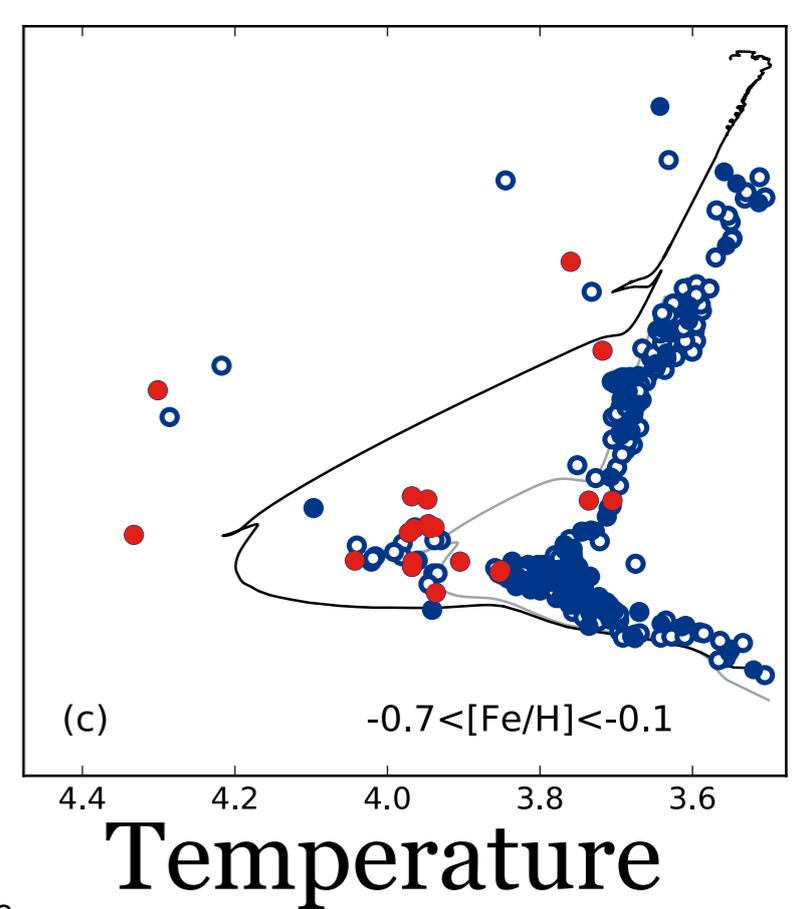
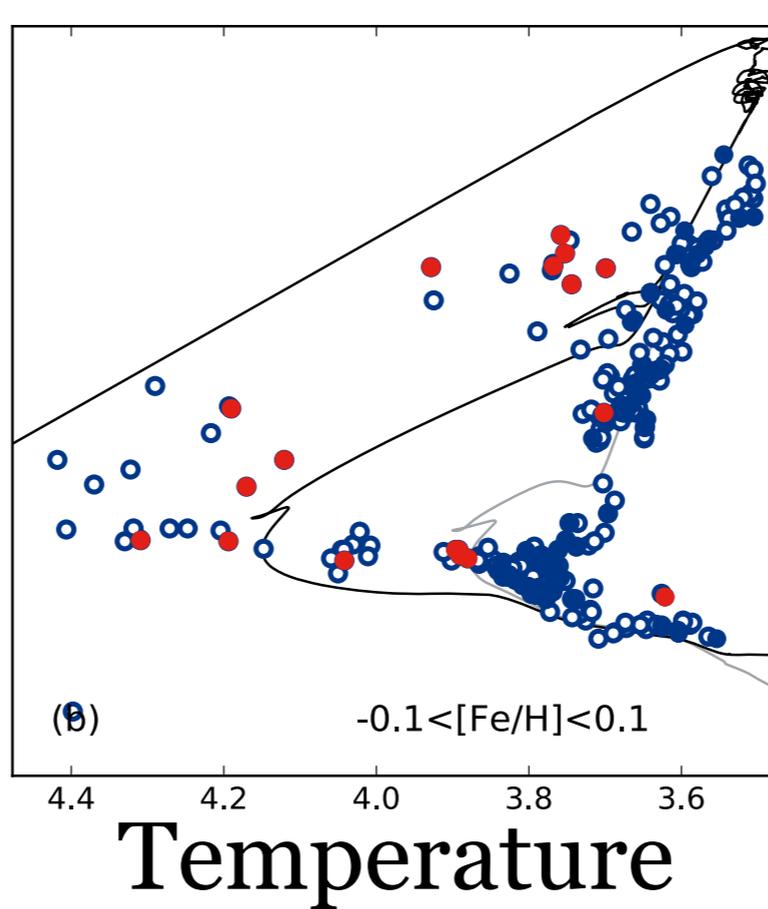
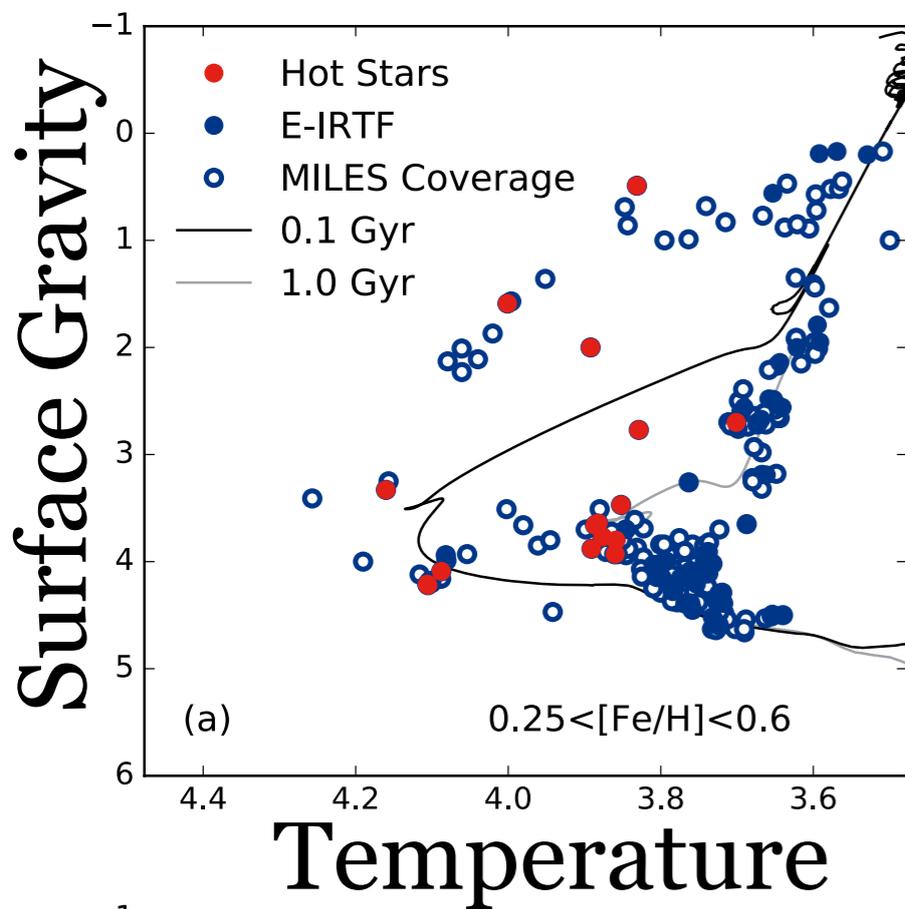


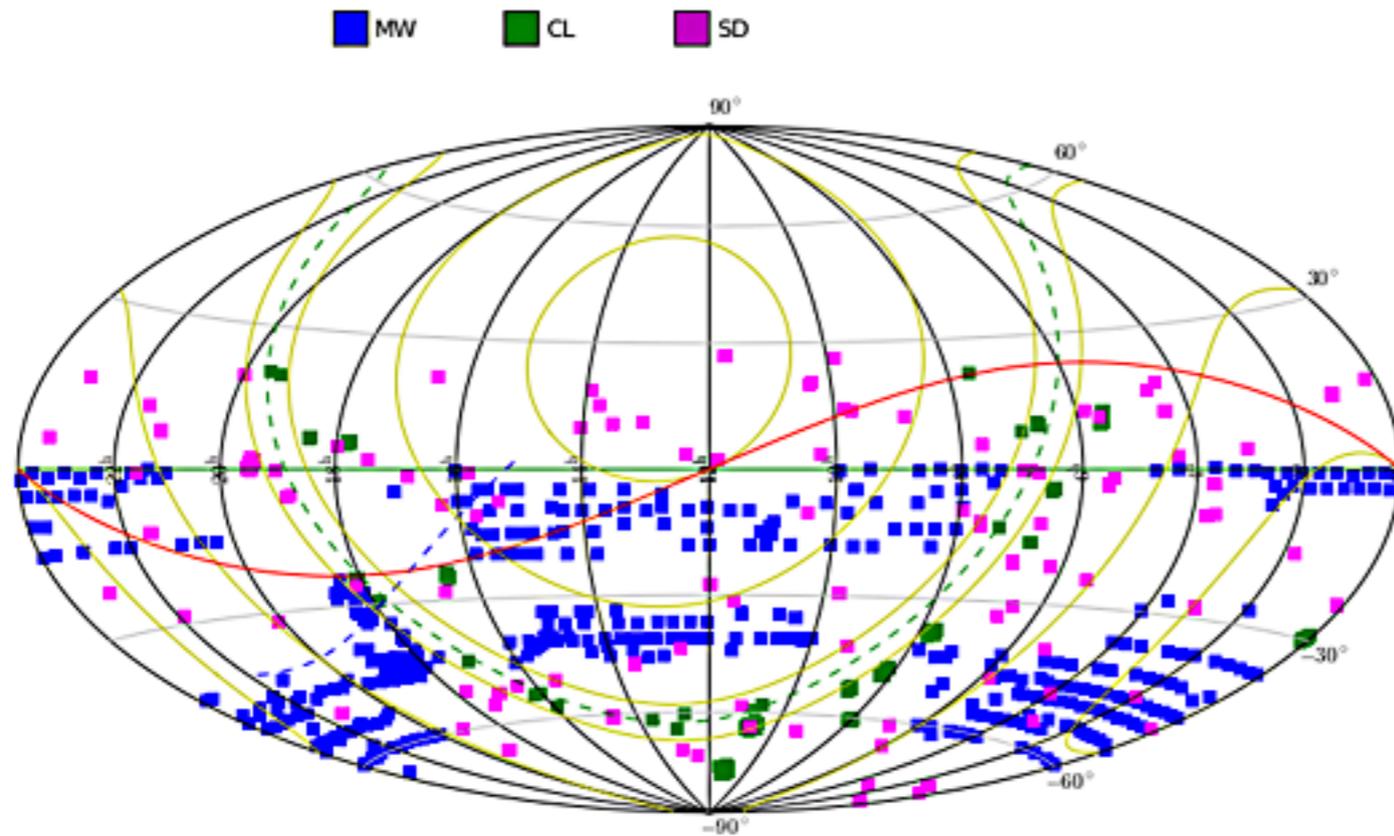
The Extended IRTF library fills out NIR coverage in stellar parameter space

Villaume et al. 2017a



Gains in stellar libraries turn into significant progress for understanding extragalactic systems





Optical stellar libraries are now hitting the “Big Data” era

Gaia-ESO will have ~100 thousand stars

More parameter coverage, access to rarer stars

How will IRTF-based libraries keep up?

Spextools is great — can it be automated?

How to spend less time observing standard stars?

Any library that involves “grafting” an IR library onto an optical library is going to struggle with variable stars