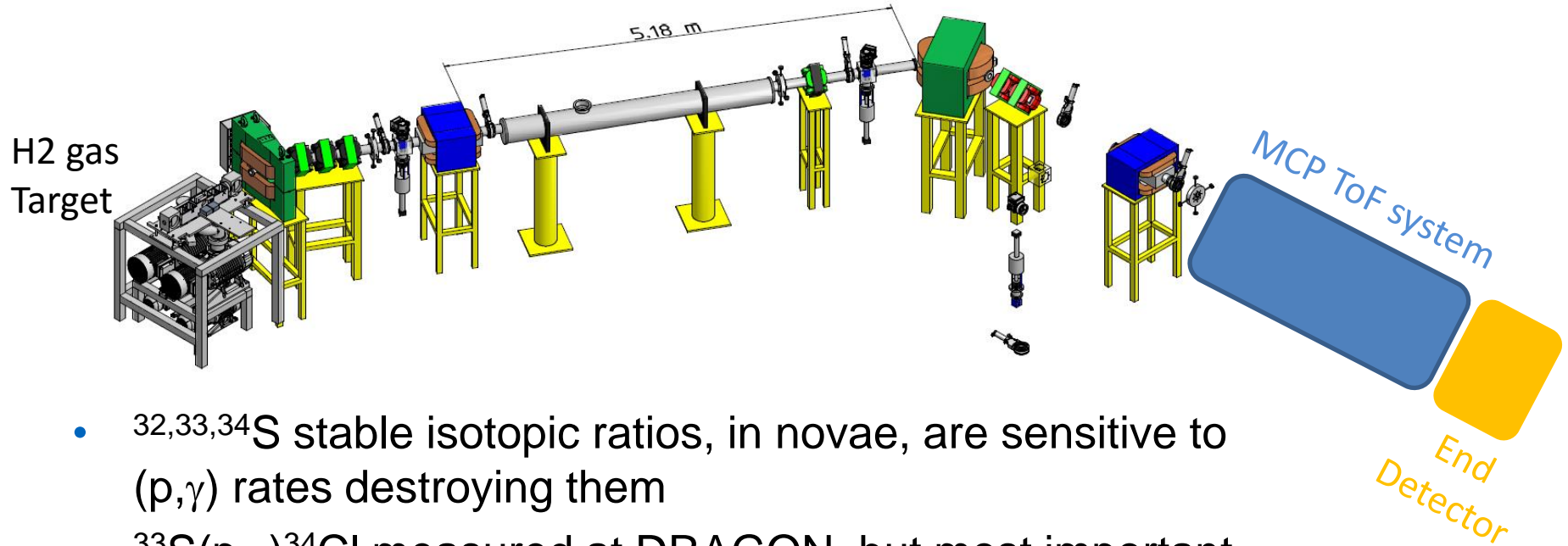


ERNA Recoil Mass Separator Development



- $^{32,33,34}\text{S}$ stable isotopic ratios, in novae, are sensitive to (p,γ) rates destroying them
- $^{33}\text{S}(p,\gamma)^{34}\text{Cl}$ measured at DRAGON, but most important ^{34}Cl resonances above threshold only had limits due to insufficient beam intensity
- Can measure these at ERNA, now in Caserta, Italy (moved from Bochum); PI Lucio Gialanella
- Will develop a MCP ToF system, for background suppression, at the Munich Maier-Leibnitz tandem lab, and then port it to ERNA

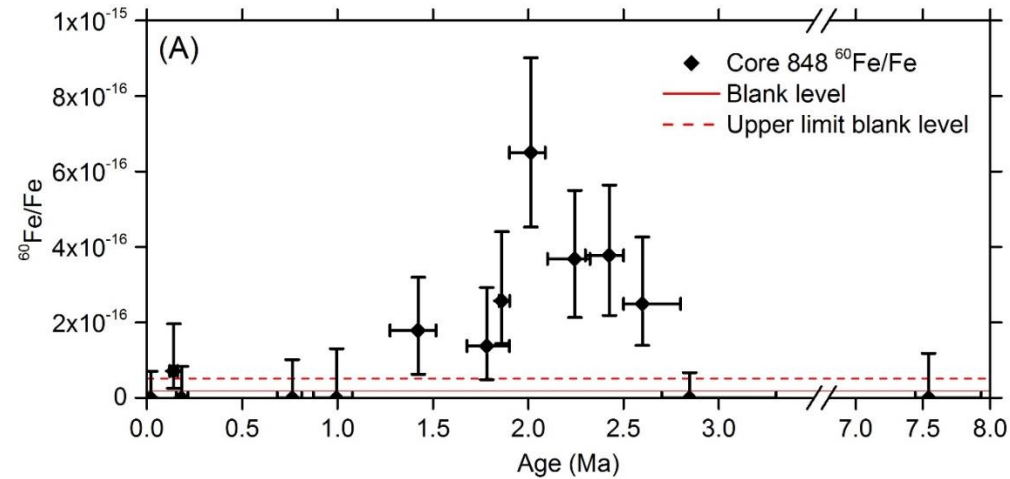
More on Novae: $^{34g,m}\text{Cl}(p,\gamma)^{35}\text{Ar}$

- $^{34g,m}\text{Cl}(p,\gamma)^{35}\text{Ar}$ versus $^{34g,m}\text{Cl} \rightarrow \beta^+ + ^{34}\text{S}$ also influences $^{32,33,34}\text{S}$ isotopic ratios
 - potentially measureable in pre-solar grains
- ^{34m}Cl also a potential “nuclear thermometer” for novae temperatures
 - 32 min half-life highly sensitive to temperature
- Try $^{34g,m}\text{Cl}(p,\gamma)$ measurement **at novae Gamow Window energies** with CRYRING
 - Would be “a first” to do a direct (p,γ) on an isomeric state, too 😊

$^{14}\text{N}(p,\gamma)^{15}\text{O}$: Globular Cluster Ages

- Sub-threshold ^{15}O state at 7.69 MeV could be sufficiently broad to potentially double this rate over existing data
- Width needs to be measured
 - Will try at the Doppler Lifetime station at MLL, using $^{14}\text{N}(d,n)$ transfer to populate it
 - MSc thesis at Maier-Leibnitz performed and saw hints. Insufficient statistics with only 12 hrs of beam

What next after biogenic supernova ^{60}Fe ?



- Search for ^{244}Pu
 - 80 Myr half-life
 - coincident with ^{60}Fe
- 35 k€ funding granted to assemble geological field expedition to
 - Acquire the 2.1 Myr old “objects” in which actinides should mass concentrated by 10^6 over what was in the water
 - Acquire the contemporary living analogues for fluence normalization using “bomb ^{244}Pu fallout”
 - Members: Bishop, Egli (^{60}Fe geomagnetist), field geologist + assistant, field geobiologist
- When? Late fall, 2016, at which time I will disclose more details