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Binarity among CEMP-no stars: an indication of multiple formation pathways?

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Understanding the origin of CEMP-no stars is crucial for our understanding of physical processes in the early universe. CEMP-no stars do not show any s-process enhancement and therefore cannot easily be explained by transfer of carbon and s-process elements from a binary AGB companion like the CEMP-s stars. This has been supported by the large radial velocity program by Hansen et al. (2016), finding a low binary fraction for CEMP-no stars. The abundance patterns of CEMP-no stars are therefore generally assumed to be direct probes of the first supernovae.

I will present here the results published in Arentsen et al. (2019). We have performed radial velocity monitoring of a sample of CEMP-no stars and we find four new binary CEMP-no stars based on their velocity variations. In our sample combined with the literature, we find a difference in binary fraction of CEMP-no stars that depends on the absolute carbon abundance. We find a binary fraction for CEMP-no stars in the Yoon et al. (2016) Groups I and III of almost 50%, while the binary fraction for stars in the less carbon-enhanced Group II is still low.

This might imply a relation between a high carbon abundance and the binarity of CEMP-no stars. Although binarity does not equate to mass transfer, there is a possibility that a CEMP-no star in a binary system has been polluted, and care has to be taken in the interpretation of their abundance patterns.

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