

Finding the lost siblings of the Sun

Cheng Liu¹, Gregory Ruchti¹, Sofia Feltzing¹, Anthony Brown², Simon Portegies Zwart², Thomas Bensby¹, Lennart Lindegren¹

¹ *Lund Observatory*

² *Leiden University*

Several observations support that the Sun was born in an open cluster consisting of a few thousand stars with a radius of about 1-3 pc (Portegies Zwart 2009, Adams 2010). Portegies Zwart (2009) proposed that about 10-60 solar siblings could still be within 100 pc of the Sun based on simulation. The aim of this paper is to find the lost siblings of the Sun by analyzing high resolution spectra and giving constraints in metallicity, stellar age and elemental abundances for nearby stars. Thirty-three solar sibling candidates which were observed with high resolution spectra were kinematically selected to trace their proper motions, parallaxes and colours. In this work, we present stellar parameters, stellar ages, and detailed elemental abundances for Na, Mg, Al, Si, Ca, Ti, Cr, Fe, and Ni for our solar sibling candidates. Our abundances analysis shows that three stars are chemically homogenous together with the Sun. Technique of chemical tagging gives us high probability that they share the same origin as the Sun. However, only one candidate --HIP 40317-- which has the solar metallicity and age could be a solar sibling.