The Outer Galactic Halo in the Chandra Deep Field South

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The Galactic Halo has so far been explored up to distances of ~10 kpc and very little is known on its actual extension and properties at larger distances. With the present work we aimed at study the properties of the outer Galactic Halo through a pencil-beam spectroscopic survey. We have used the FLAMES facility on the ESO 8.2m VLT/Kueyen telescope to obtain medium resolution (R~10000) spectra of nearly 200 stars, down to V~20, in the Chandra Deep Field South. The spectra have been analyzed with state of the art model atmospheres and spectrum synthesis techniques to determine chemical abundances, kinematical and physical properties of each star of the sample. We found that although the density of Halo stars decreases at increasing distances the Galactic Halo extends up to at least 165~kpc from the Galactic Centre. Our stars constitute a pure Halo sample with a mean [Fe/H]=-1.4 and a large metallicity dispersion, covering the range from -2.4 to -0.1. There is a suggestion of a weak metallicity gradient in the Halo, but compatible with the standard modeling provided by the Besançon group. All of the Milky Way satellites effectively move inside the Galactic Halo, which is a very low density environment. It seems unavoidable that part of the Halo is indeed constituted by tidal debris of such satellites but we have not found clear signatures (i.e. anomalous alpha elements) of the tidal origin of our Halo sample.

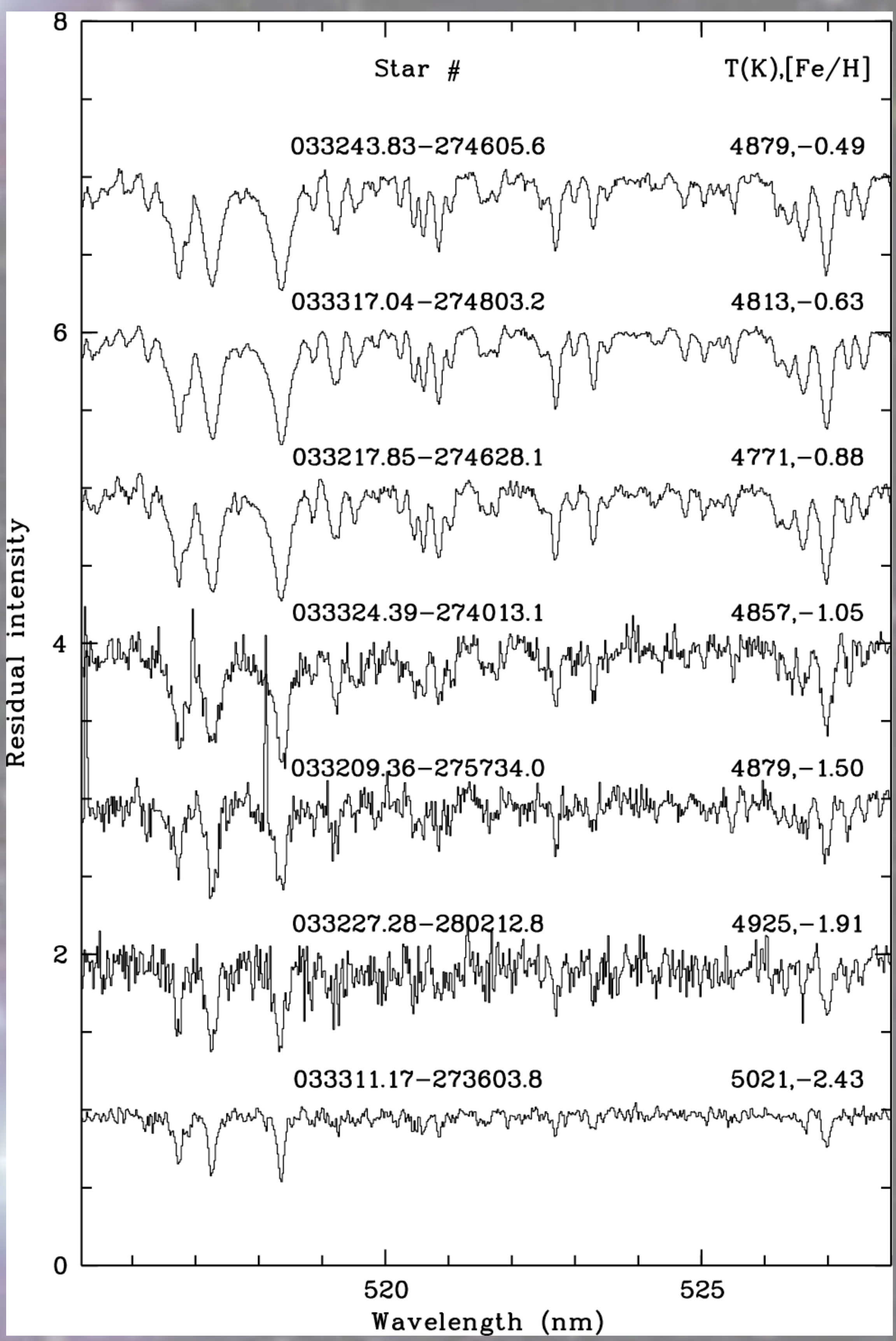

Fig.1. *7 GIRAFFE spectra of dwarfs of similar Teff, same gravity (log g=4.00) and [Fe/H] decreasing from top to down. The spectra are upward displaced for display purposes.*

Fig.2. *Orbital solution for one of the giant star locate actually at 100 kpc from the galactic Center.*

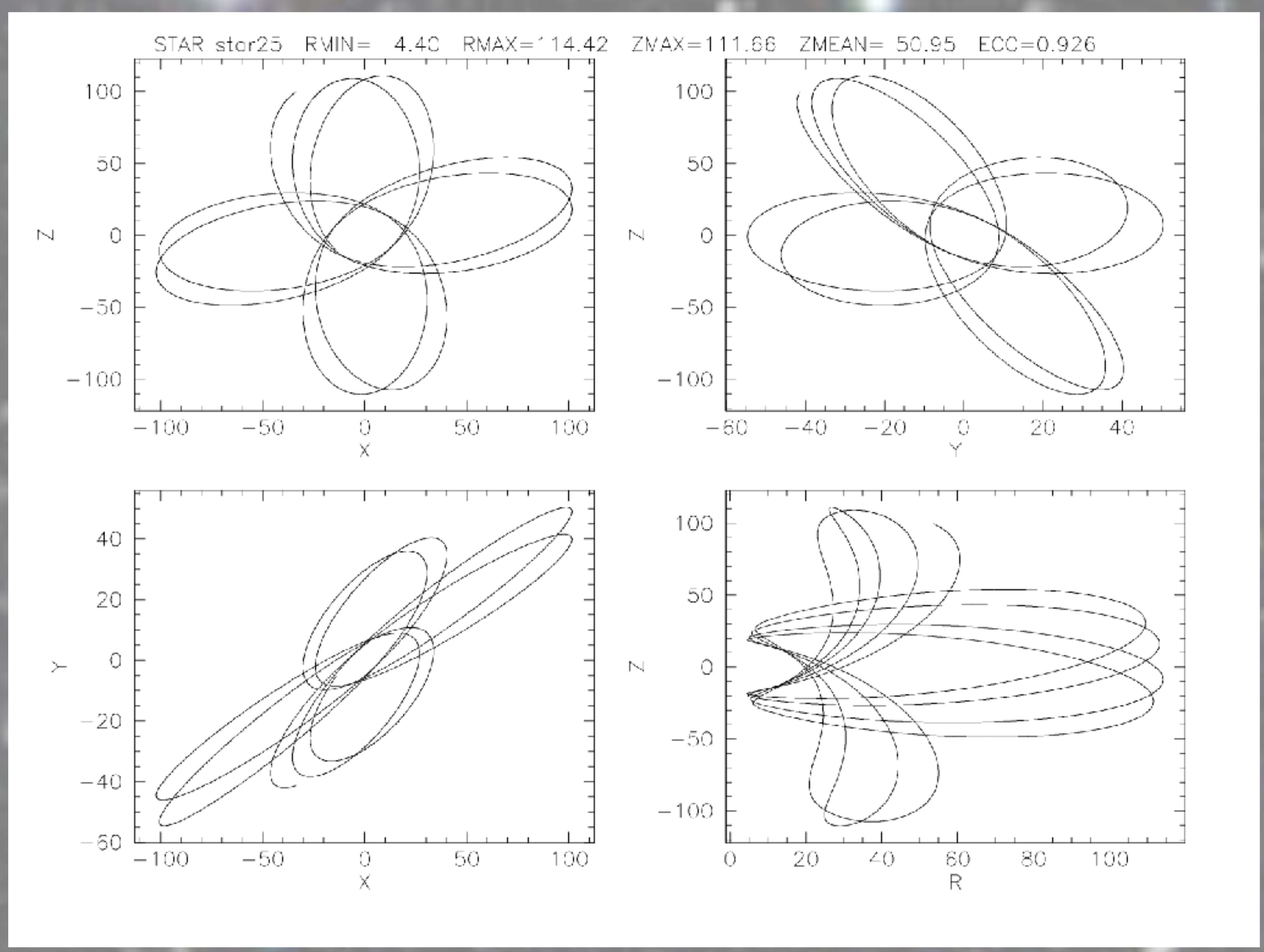

Fig.3. *Comparison of the radial trend of the metallicity measurements (left) and the radial velocity (right) of the CDFS stars with standard galactic models of the Besançon group. Red dots are Giant stars, green dots are dwarf stars. Only stars with Teff>3800 defrees are shown. The contours are the predictions from the besancon modeling.*