

The halo plus cluster system of the Galactic globular cluster NGC 1851(a similar to...)

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Abstract

NGC 1851 is surrounded by a stellar component that extends more than 10 times beyond the tidal radius. Although the nature of this stellar structure is not known, it has been suggested to be a sparse halo of stars or associated with a stellar stream. We analyse the nature of this intriguing stellar component surrounding NGC 1851 by investigating its radial velocities and chemical composition, in particular in comparison with those of the central cluster analysed in a homogeneous manner. In total we observed 23 stars in the halo with radial velocities consistent with NGC 1851, and for 15 of them we infer $[\text{Fe}/\text{H}]$ abundances. Our results show that (i) stars dynamically linked to NGC 1851 are present at least up to ~ 2.5 tidal radii, supporting the presence of a halo of stars surrounding the cluster; (ii) apart from the NGC 1851 radial velocity-like stars, our observed velocity distribution agrees with that expected from Galactic models, suggesting that no other substructure (such as a stream) at different radial velocities is present in our field; (iii) the chemical abundances for the s-process elements Sr and Ba are consistent with the s-normal stars observed in NGC 1851; (iv) all halo stars have metallicities, and abundances for the other studied elements Ca, Mg and Cr, consistent with those exhibited by the cluster. The complexity of the whole NGC 1851 cluster+halo system may agree with the scenario of a tidally disrupted dwarf galaxy in which NGC 1851 was originally embedded.

Keywords

Techniques: imaging spectroscopy, Globular clusters: general, Globular clusters: individual: NGC 1851.