We explore the solar neighbourhood of the Milky Way using the new kinematic survey we produced by means of spectro-photometric data from the Sloan Digital Sky Survey and high-quality proper motions derived from the Guide Star Catalog II.

We select samples of subdwarfs within a few kpc from the Sun which are adopted as tracers of the halo.

We find statistical evidence for discrete overdensities, likely possible accretion remnants, and compare this result to high resolution N-body numerical simulations of minor mergers accreted and present what Gaia will reveal.

Now and in the Gaia era, this knowledge will set the basis for future studies and provide significant clues to constrain the scenarios of the formation and evolution of the Milky Way.

**DATA:**

(very high velocity stellar) halo streams

- In a CDM Universe, galaxies like the Milky Way grow by mergers of dwarf galaxies; this theory predicts the presence of substructures due to accretions experienced over their lifetime. Considerable structure is still present in the halo of the Milky Way, indicating that such events have had a role in its formation history (e.g. Ibata et al. 1994; Majewski et al. 1996; Helmi 1999; Ivezić 2000; Re Fiorentin 2005; Morrison 2009; Klement 2009).

The Galactic halo may retain memory of its merging history in the form of fossil streams of stars which, although sometimes of very low spatial density, may be detectable as stellar groups with coherent kinematics and metallicities.

- We find statistical evidence of substructure in the space motions of the fastest moving stars, due to a small number of moving groups, possibly remnants, and compare this result to high resolution N-body simulations of minor mergers accreted and present what Gaia will reveal.

Now and in the Gaia era, this knowledge will set the basis for future studies and provide significant clues to constrain the scenarios of the formation and evolution of the Milky Way.

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**REMARKS:**

We have found statistical evidence of substructure in the space motions of the fastest moving stars, due to a small number of moving groups, possible fossil remnants from high inclination/low inclination retrograde orbits.

This evidence is supported by high resolution N-body simulations designed to study the four minor merger of orbiting satellites.

- In the velocity distribution and the angular momentum phase space of the local halo, tracers do appear very coherent.

- Among the subsample of the fastest objects, the regions of high inclination and retrograde orbits are populated consistently to observed data according to the mechanism of dynamical friction and the effects of mergers in the local Universe.

- Convolution between real data with high resolution N-body simulations and the accuracy of a 10% and the uncertainty predicted for Gaia these findings are confirmed.

These findings, if confirmed by further studies, are of great importance for constraining models of the formation and evolution of the Milky Way, and structures in the Universe.

- Space astrometric missions, such as Gaia, will collect samples of millions of stars with very accurate positions and velocities which will dramatically improve the reliability of such conclusions.