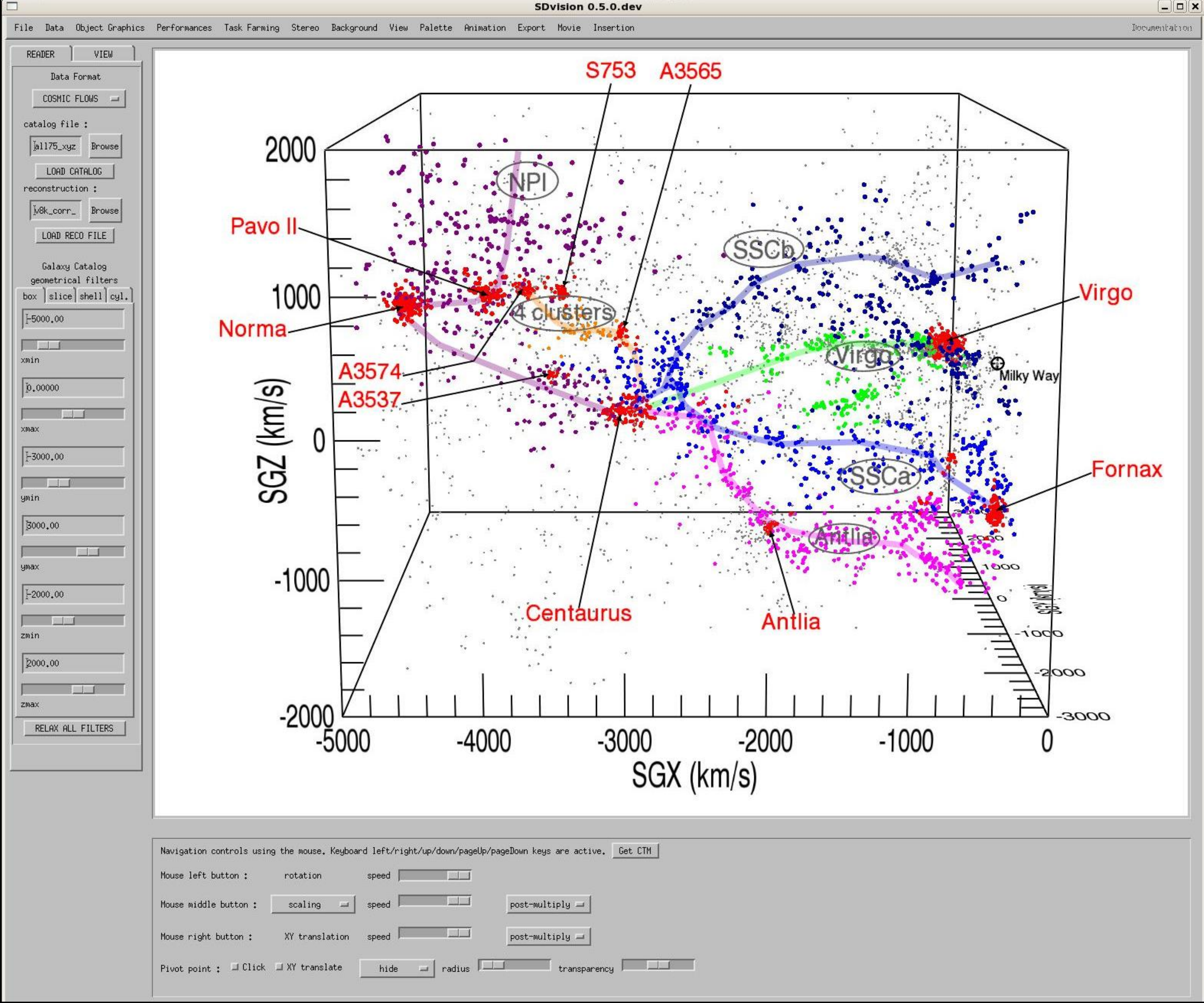
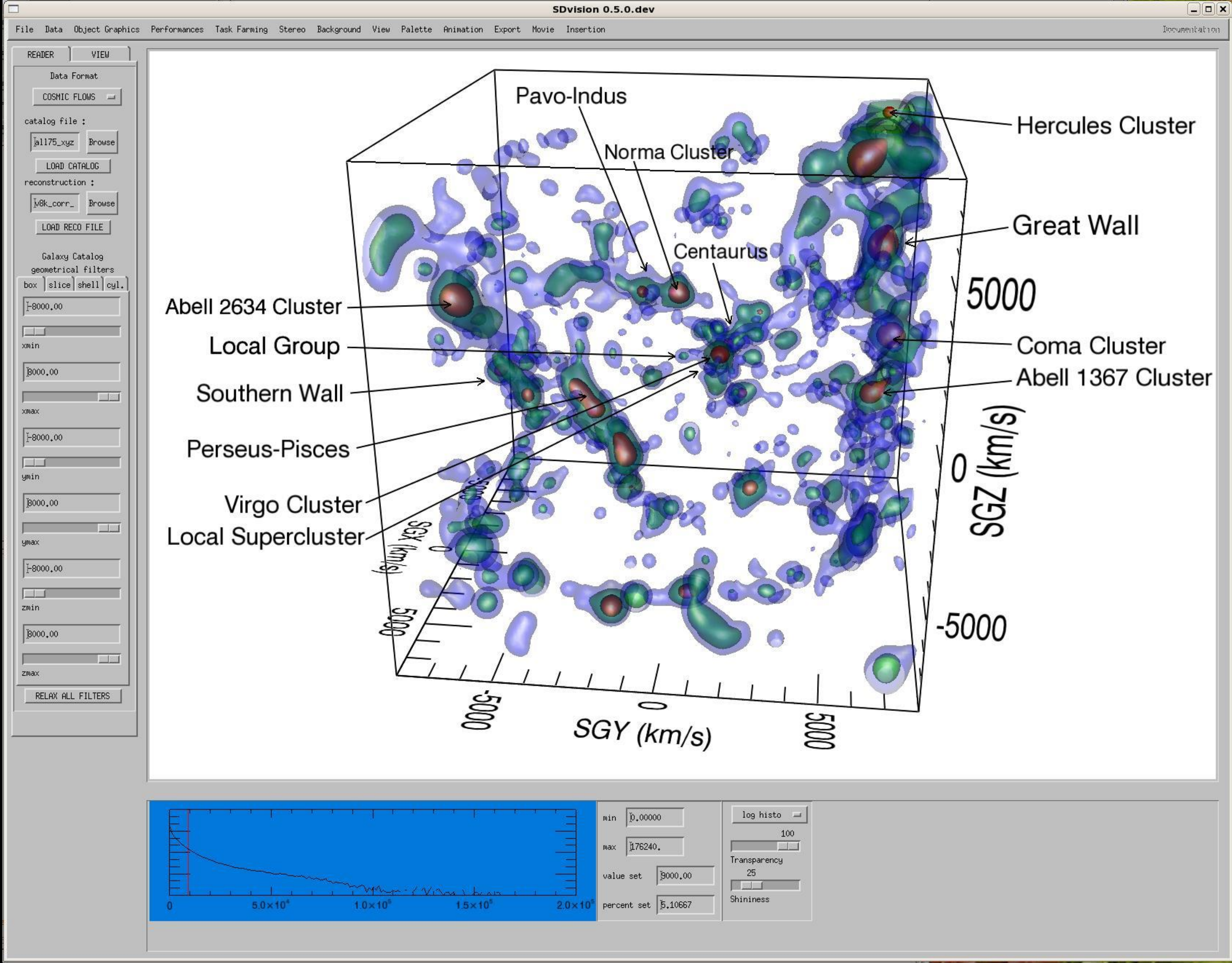


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Cosmography is the creation of maps of the Universe. Using the SDvision 3D visualization software developed within the framework of IDL Object Graphics, we have established a cosmography of the Local Universe, based on multiple data products from the Cosmic Flows Project. These data include catalogs of redshifts, catalogs of peculiar velocities, and reconstructed density and velocity fields. On the basis of the various visualization techniques offered by the SDvision software, that rely on multicore computing and OpenGL hardware acceleration, we have created maps displaying the structure of the Local Universe where the most prominent features such as superclusters, voids, clusters of galaxies, filaments and walls, are identified and named. Maps also display the dynamical information of the cosmic flows, which are the bulk motions of galaxies, of gravitational origin. These maps highlight peculiar conformations in the cosmic flows such as the streaming along filaments, or the existence of local attractors and repellers. This visualization software was used in the discovery of the frontiers of Laniakea, our Home Supercluster of galaxies.



The SDvision interface used to visualize the position of galaxies from the V8k Catalog of redshifts. This visualization exposes the peculiar nature of the Centaurus cluster of galaxies, a local node in the neighboring cosmic web, where five filaments are converging. The SDvision software consists in 90,000 lines of code deployed in the IDL Object Graphics framework. It is developed at the Institute of Research into the Fundamental Laws of the Universe (IRFU) at CEA Saclay, France, in the context of the COAST « Computational Astrophysics » Program.

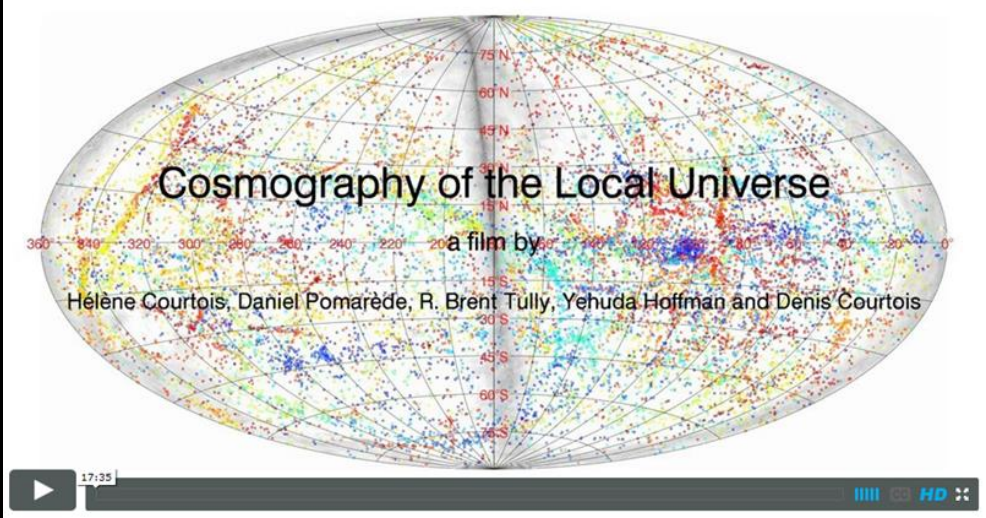


The SDvision interface used to visualize three levels of the reconstructed density field of the V8k Catalog of redshift corrected for incompleteness. The data are provided by the Cosmic Flows Project, an open collaboration aiming at mapping the visible and Dark Matter content of the Local Universe using measurements of the galaxies deviant motion with respect to the Hubble expansion.
The Cosmic Flows Project Web Page: <http://www.ipnl.in2p3.fr/projet/cosmicflows>
The COAST Program Web Page: <http://irfu.cea.fr/projets/coast>

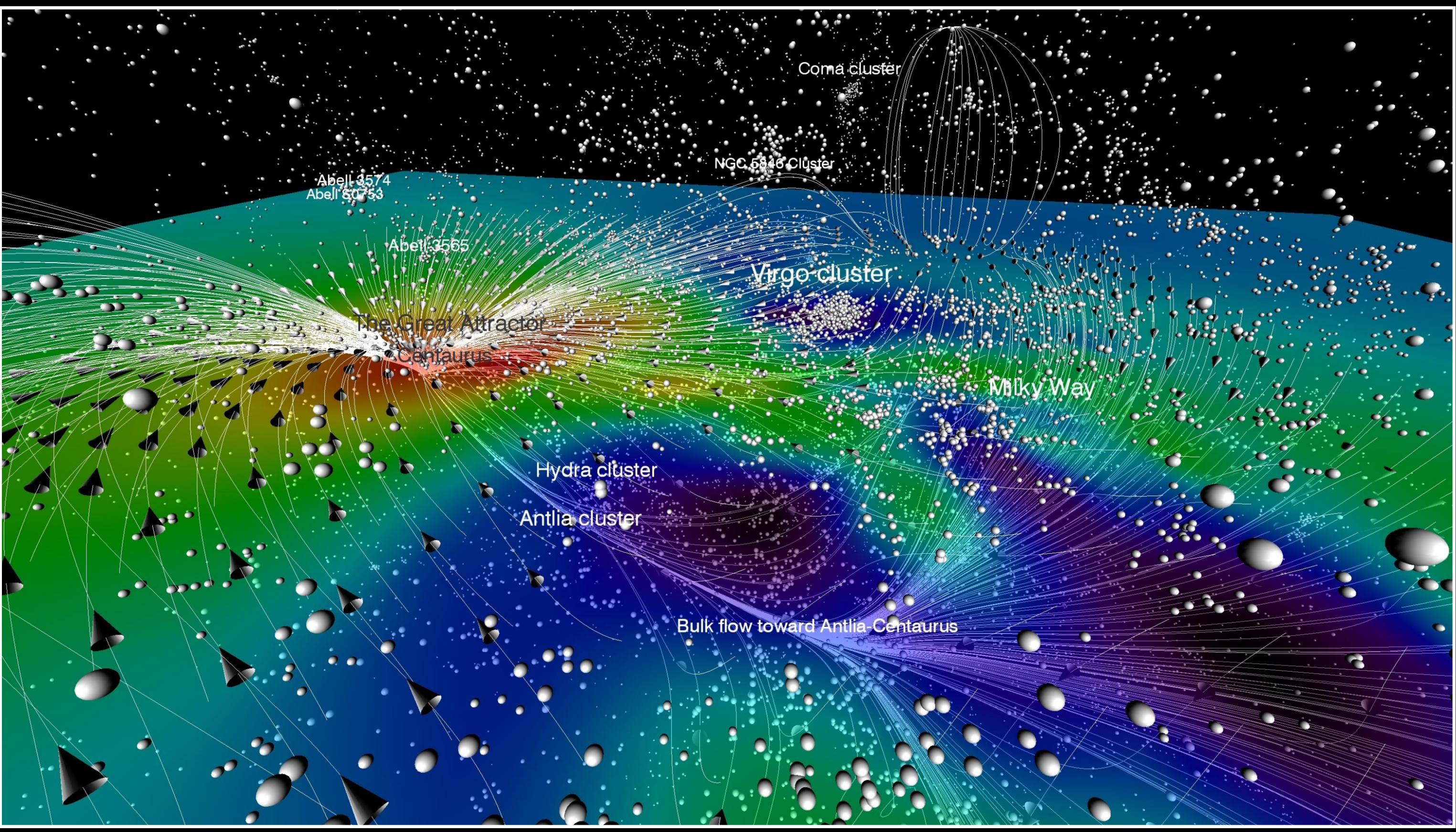


The SDvision software was used to publish a cosmography of the Local Universe consisting in 23 maps and a 17-minutes video exploring:
1) the cartography of the positions of a catalog of 30,000 galaxies
2) the cartography of cosmic flows (reconstructed velocity field) computed using a Wiener Filter
3) the cartography of the reconstructed density field inferred from these cosmic flows

The video is available at <http://irfu.cea.fr/cosmography>



Stats: 335,000 views, 50 views/day

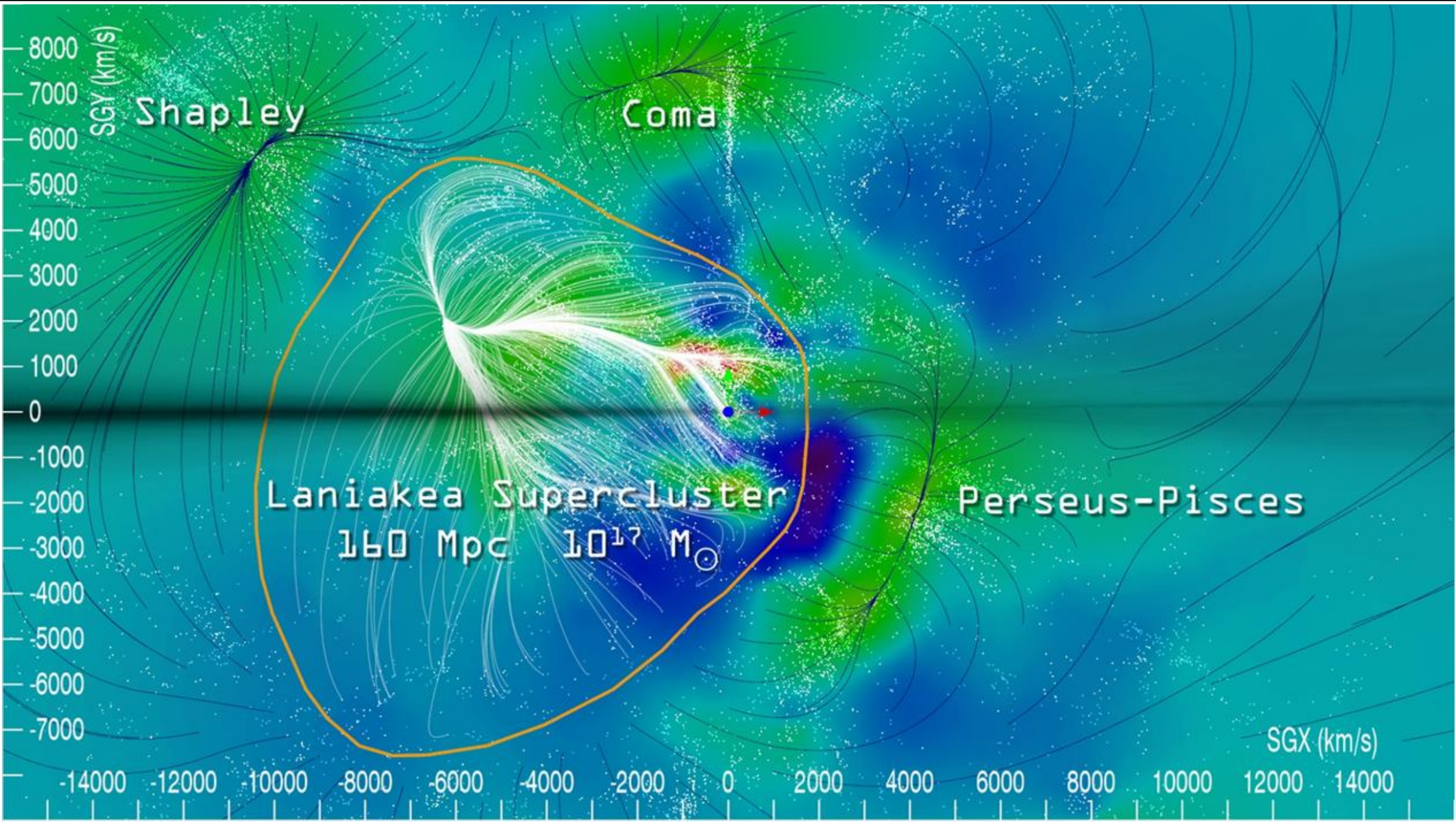


The SDvision software was used in the discovery of the frontiers of our Home Supercluster of galaxies, Laniakea. The frontiers of the supercluster are reconstructed and visualized using the concept of the gravitational basin of attraction within which the cosmic flows are converging on a unique attractor.

a video produced on the basis of these visualizations is available at <http://irfu.cea.fr/laniakea>



2.5 million views, most popular video ever of the «Nature Video» channel on YouTube



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