# LSSGalPy & GalPyZoo:
# Python tools for astronomical data visualization

M. Argudo-Fernández[1], S. Duarte Puertas[2], S. Verley[3], J. Sabater[4], J. E. Ruiz[2]

[1]*Shanghai Astronomical Observatory, Chinese Academy of Sciences, Shanghai, China* – [2]*Instituto de Astrofísica de Andalucía (IAA-CSIC), Granada, Spain*
[3]*Universidad de Granada, Granada, Spain* – [4]*Institute for Astronomy, University of Edinburgh, Edinburgh, UK*

## Abstract

We present **LSSGalPy** and **GalPyZoo**, two different **free open source tools for astronomical data visualization**. LSSGalPy contains the visualisation tools developed for the A&A Article Catalogues of isolated galaxies, isolated pairs, and isolated triplets in the local Universe by Argudo-Fernández et al. (2015). The basic functionality of LSSGalPy is the use of a Mollweide projection in combination with a wedge diagram to study the **relation of the galaxies with the large-scale structure (LSS)**. GalPyZoo is an under-development code focused on **visual morphological classification** of galaxies. LSSGalPy is available at https://github.com/margudo/LSSGALPY.

## LSSGalPy: Mollweide projection



Mollweide projection within 0.030 < z < 0.035
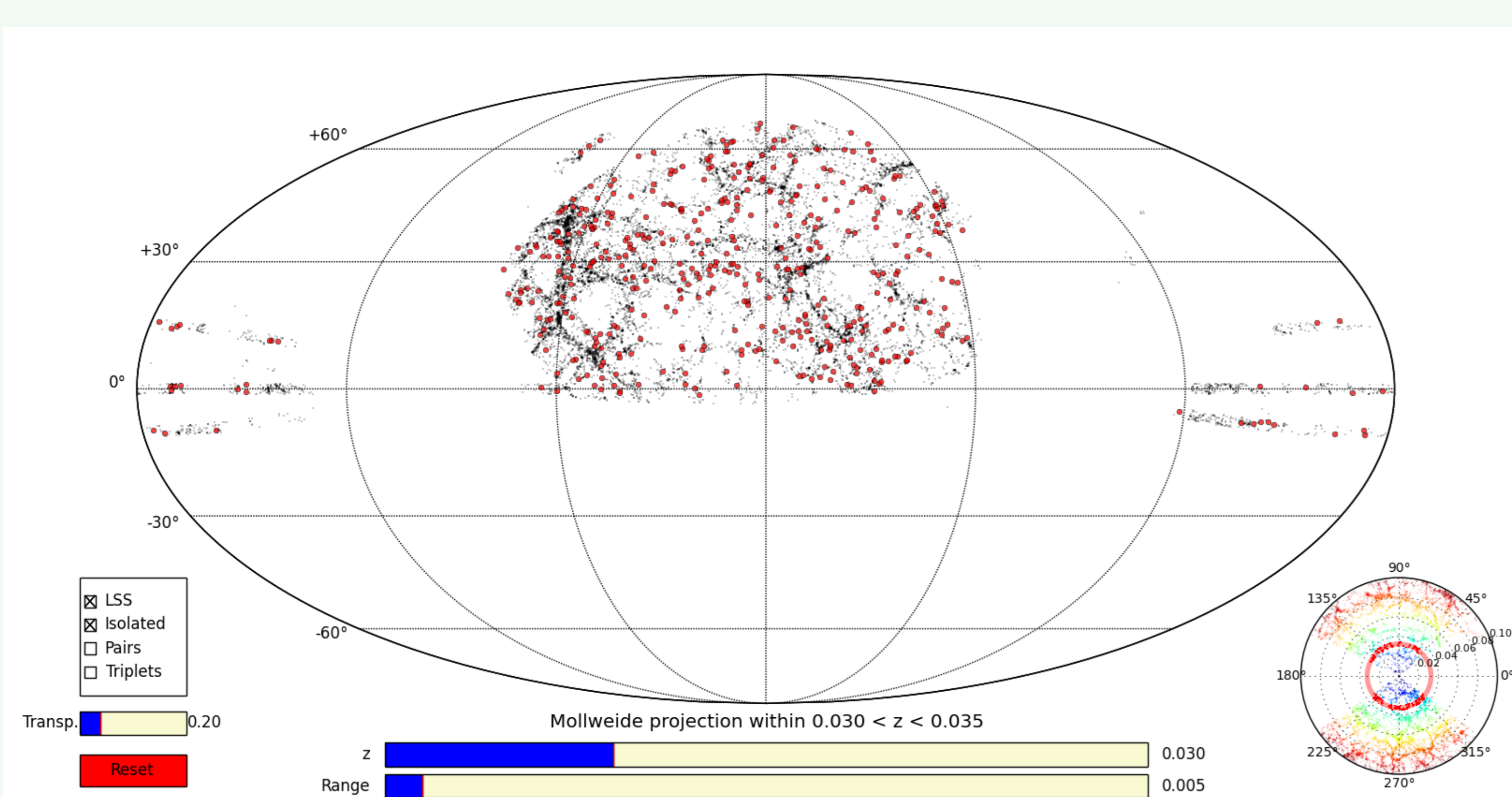
- ► LSSGalPy is an **interactive tool** for the **visualization of the large-scale environment around galaxies** on the 3D space (right ascension, declination, and redshift).
- ► We use a **Mollweide projection, in combination with a wedge diagram**, to visualise the locations of the galaxies for different values of redshifts and redshift ranges (by moving the blue bars displayed under the sky map in the figure).
- ► LSSGalPy has been **tested using up to 30 million objects** and still work perfectly and very smoothly on any standard laptop.

## LSSGalPy: Wedge diagram



Wedge diagram within 0.0° < Dec. < 5.0°
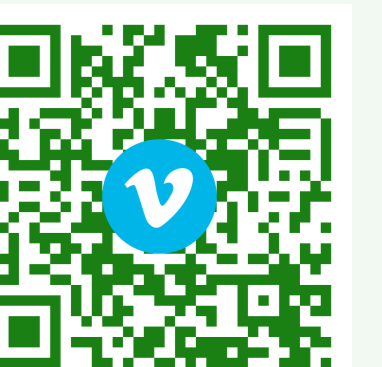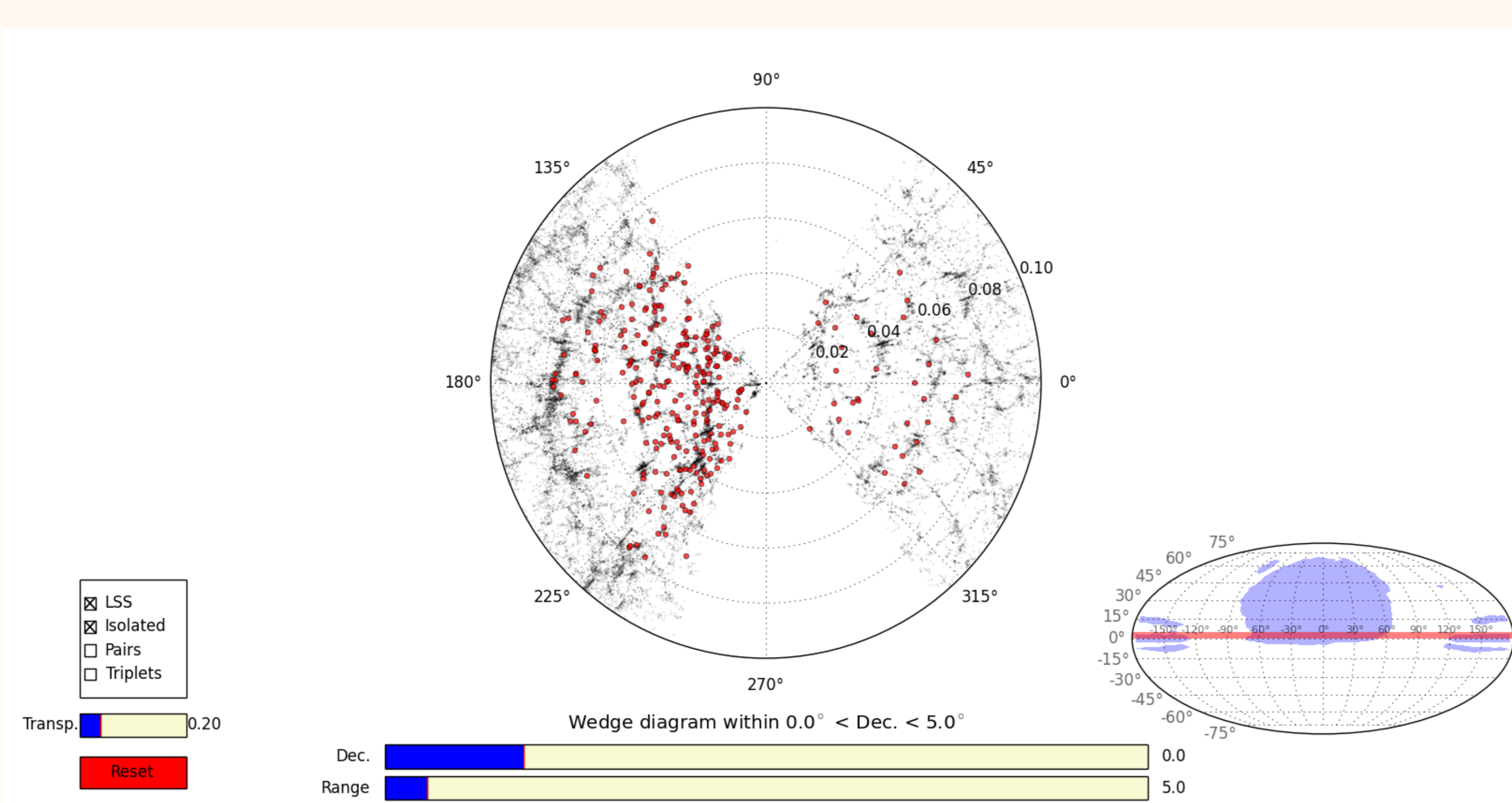
- ► Complementary, for different values of the declinations and declination ranges, a **wedge diagram** allows us to distinguish between **walls and clusters**, where clusters appear elongated in the radial direction.
- ► The whole **code is 100% based on free software** (MIT License), making extensive use of the Python language.
- ► LSSGalPy currently work as widgets in a local computer but could be also accessed remotely with a browser when they are implemented in an **IPython Notebook** Server (web-based interactive computational environment).
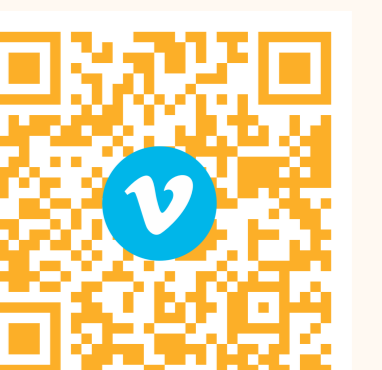
## GalPyZoo



- ► GalPyZoo is an interactive tool for the **visual morphological classification of galaxies**.
- ► The tool has been adapted to **easily classify the visual degree of galaxy interaction**. The **homogeneous results can be shared** between collaborators for analysis and comparisons.
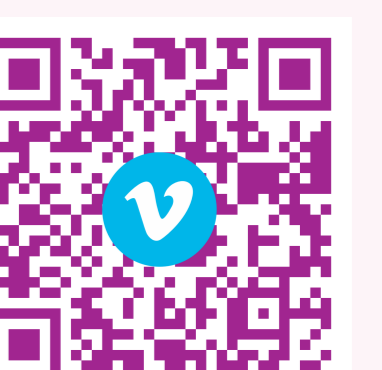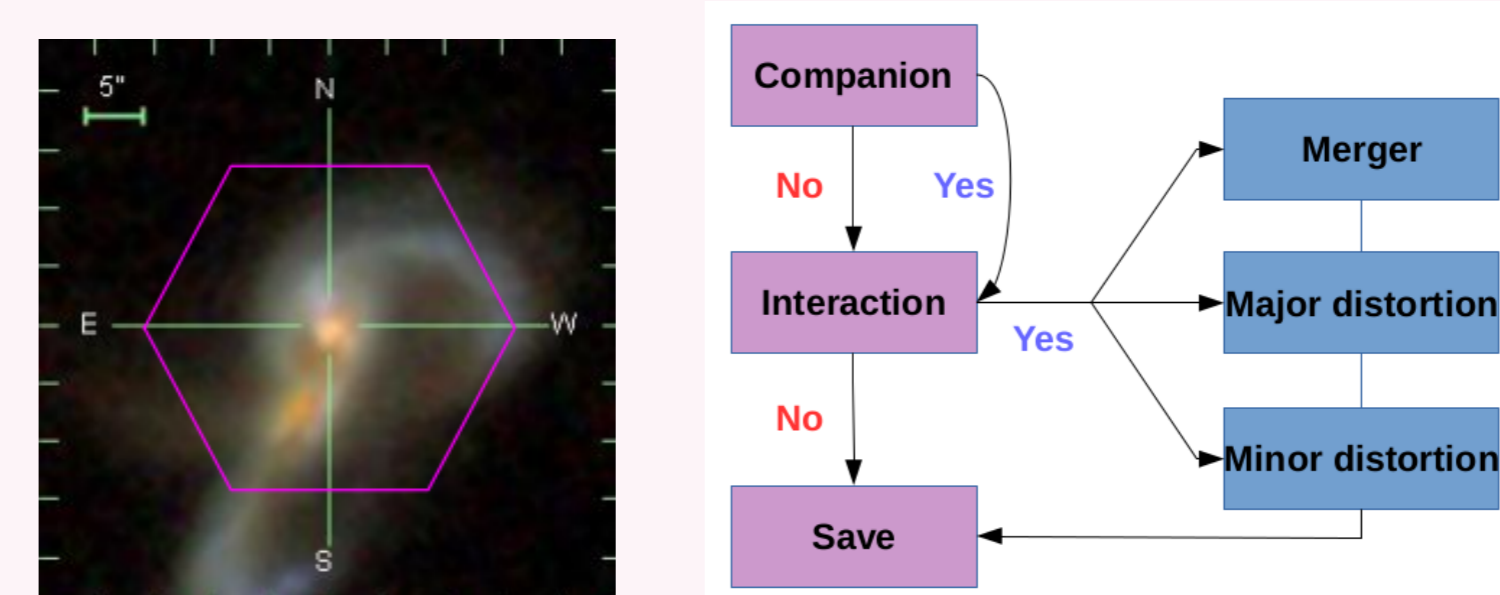
References:
1. Argudo-Fernández et al. 2015, A&A 578, A110