

# Colliding Galaxies

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Galaxies are huge concentrations of stars, gas and dust. Galaxies contain between  $10^6$  and  $10^{11}$  solar masses of stars, gas and dust. The smallest galaxies have diameters of a few thousand lightyears, and the largest galaxies of hundred thousand lightyears. Galaxies often occur in clusters containing tens to thousands of members. They move with speeds of several hundred km/s with respect to one another. Our own galaxy is part of the “local group” which contains a few dozen members.

Due to the large sizes of the galaxies and their clustering properties collisions and near-collisions occur frequently. It appears that galaxy-galaxy interactions seem to be more rule than exception. Our own galaxy experienced several close encounters and has “cannibalized” several smaller galaxies. We can detect the remnants of these encounters.

The Hubble Space Telescope has observed many colliding or interacting galaxies. The strong gravitational interaction results in a scala of fascinating features: bridges, tails, spiral arms, usually accompanied by bursts of star formation.

We will show a number spectacular images of (nearly)-colliding and merging galaxies and explain the main features and properties. Movies with numerical simulations help us to understand the physical processes and the history of collisions. We will then zoom into one particular interacting galaxy system: “the Whirlpool system” as an example to show a galaxy reacts to a close encounter.