

Astronomy Talk 9th October 2018

The Mystery of 29P

Richard Miles came to talk about the strange outbursts that the comet 29P/Schwassmann–Wachmann periodically exhibits. 29P is a Centaur, and orbits outside the orbit of Jupiter, never coming into the inner solar system. Richard first explained some of the history of comets, and how we came to think of them as “dirty snowballs”. He stressed the error astronomers make in assuming there aren’t any liquids in comets, which radically affects the processes possible.

Rosetta’s mission to 67P showed a hard crust rather than soft icy snow, and this enables pressure to build up underneath, enabling various fluids to form.

Normal activity is a steady outflow from solar heating. Disintegration causes chaotic outbursts. Thirdly, explosive eruptions can occur, e.g. Comet Holmes recently. Richard showed many pictures of the asymmetric nature of these outbursts, which he characterised as more like geysers than eruptions, and also showed an association with comets with very slow rotations, 57 days in 29P’s case, which allows solar energy to build up under the crust.

The mechanism is the dissolution of gases into the liquids, followed by exsolution when pressure is released, e.g. by the crust cracking, in the same way that superheated water caused the Mt St Helens volcano to be so explosive: similarly with an uncorked champagne bottle.

It turns out there are lots of hydrocarbons in comets, as found by the Rosetta probe, and the larger ones, especially propane, can act as efficient absorbers of CO. The absorption of gas releases heat which adds to the pressure and can make a positive feedback to absorb more gas until it blows.

This was a very well argued talk, with many examples and technical illustrations supporting Richard’s argument. It was held in association with the Institute of Physics.