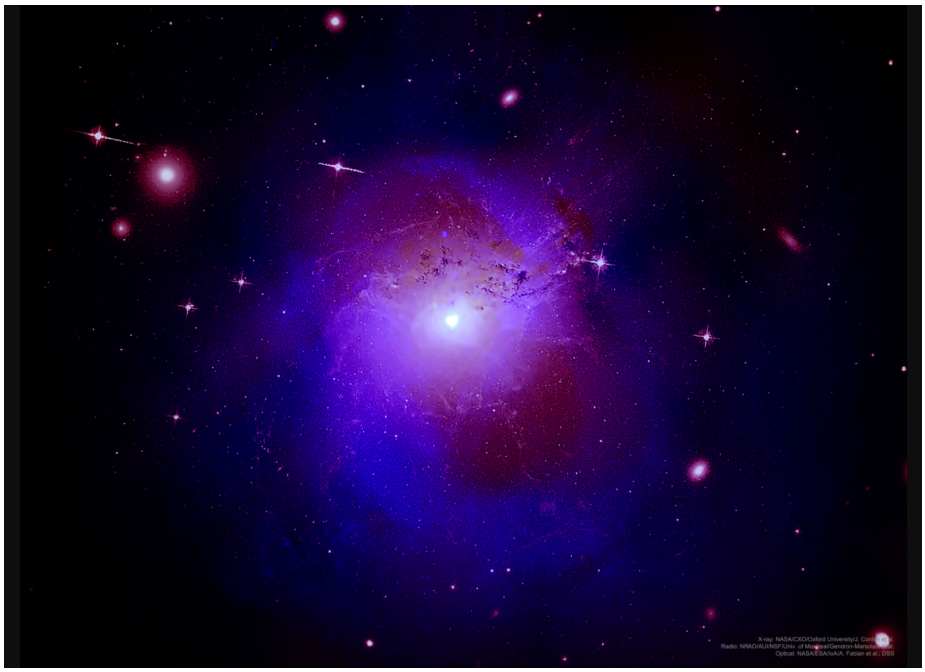
January 1, 2018

Explanation:
What's happened to the Sun? Sometimes it looks like the Sun is being viewed through a giant lens. In the featured video, however, there are actually millions of tiny lenses: ice crystals. Water may freeze in the atmosphere into small, flat, six-sided, ice crystals. As these crystals flutter to the ground, much time is spent with their faces flat and parallel to the ground. An observer may find themselves in the same plane as many of the falling ice crystals near sunrise or sunset. During this alignment, each crystal can act like a miniature lens, refracting sunlight into our view and creating phenomena like parhelia, the technical term for sundogs. The featured video was taken a month ago on the side of a ski hill at the Vemdalen Ski Resort in central Sweden. Visible in the center is the most direct image of the Sun, while two bright sundogs glow prominently from both the left and the right. Also visible is the bright 22 degree halo -- as well as the rarer and much fainter 46 degree halo -- also created by sunlight reflecting off of atmospheric ice crystals.

January 2, 2018



Explanation:
Why does the Perseus galaxy cluster shine so strangely in one specific color of X-rays? No one is sure, but a much-debated hypothesis holds that these X-rays are a clue to the long-sought identity of dark matter. At the center of this mystery is a 3.5 Kilo-electronvolt (KeV) X-ray color that appears to glow excessively only when regions well outside the cluster center are observed, whereas the area directly surrounding a likely central supermassive black hole is actually deficient in 3.5 keV X-rays. One proposed resolution -- quite controversial -- is that something never seen before might be present: fluorescent dark matter (FDM). This form of particle dark matter might be able to absorb 3.5 keV X-radiation. If operating, FDM, after absorption, might later emit these X-rays from all over the cluster, creating an emission line. However, when seen superposed in front of the central region surrounding the black hole, FDM's absorption would be more prominent, creating an absorption line. Pictured, a composite image of the Perseus galaxy cluster shows visible and radio light in red, and X-ray light from the Earth-orbiting Chandra Observatory in blue.

January 3, 2018

Explanation:
Will our Sun look like this one day? The Helix Nebula is one of brightest and closest examples of a planetary nebula, a gas cloud created at the end of the life of a Sun-like star. The outer gasses of the star expelled into space appear from our vantage point as if we are looking down a helix. The remnant central stellar core, destined to become a white dwarf star, glows in light so energetic it causes the previously expelled gas to fluoresce. The Helix Nebula, given a technical designation of NGC 7293, lies about 700 light-years away towards the constellation of the Water Bearer (Aquarius) and spans about 2.5 light-years. The featured picture was taken with the Canada-France-Hawaii Telescope (CFHT) located atop a dormant volcano in Hawaii, USA. A close-up of the inner edge of the Helix Nebula shows complex gas knots of unknown origin.