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Surveillance of Ionized Hydrogen Near Supermassive Black Holes

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Central regions of several nearby spiral galaxies appear completely void of atomic hydrogen, the most abundant element in the Universe. Using a telescope at the Etscorn Observatory fitted with a charge coupled device with several different filters, direct observations of spiral galaxies have been made. The detection of ionized hydrogen is expected to take the place of the absent atomic hydrogen. Ionized hydrogen is observed as a byproduct of the recombination of protons with freed electrons in an ionized soup of hydrogen atoms. This recombining of particles triggers the emission of a specific wavelength photon in a process known as H-alpha emission. The galaxies M81 and NGC 2903 show the presence of ionized hydrogen, glowing strongly in the images produced using an H-alpha filter. Ionized hydrogen resides in galactic environments with energy sources high enough to strip electrons from their host protons. The primary sources of this ionization energy are the supermassive black hole located at the centers of M81 and NGC 2903. When matter forms an accretion disk around a supermassive black hole it forms a quasar. Quasars emit a powerful amount of radiation, which is hypothesized as the source for the energy needed to ionize the surrounding atomic hydrogen.

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