

# Active Galactic Nuclei (AGNs)

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## About Active galactic nucleus

- Many galaxies have very bright nuclei, so bright that the central region can be more luminous than the remaining galaxy light. These nuclei are called active galactic nuclei, or AGN for short.
- Much of the energy output of AGNs is of a non-thermal (non-stellar) type of emission, with many AGN being strong emitters of X-rays, radio and ultraviolet radiation, as well as optical radiation. AGN can vary in luminosity on short (hours or days) timescales. This means that the light or energy emitting source must be of order light hours or light days (respectively) in size, and gives clues as to the energy mechanism.
- Many classes of “active galaxies” have been identified—for example, quasars, radio galaxies, and Seyfert galaxies.
- The observed energy is generated as matter accretes onto a supermassive black hole with a mass millions or even billions of times that of the Sun.
- The accreting matter can outshine the rest of the galaxy as it is heated in very high-speed collisions outside the black hole’s event horizon.
- It is believed that many galaxies harbour these central black holes and that they might have been quasars in their early history, although they now appear to be dormant unless orbiting matter is accreting onto the black hole.
- Numerous subclasses of AGN have been defined based on their observed characteristics; the most powerful AGN are classified as quasars. A blazar is an AGN with a jet pointed toward the Earth, in which radiation from the jet is enhanced by relativistic beaming.