40th SYMPOSIUM ON THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE (SETI) – The Next Steps (A4)
SETI I : SETI Science and Technology (1)

Author: Dr. Claudio Maccone
International Academy of Astronautics (IAA), Italy

EXTENDING SETI TO NEARBY GALAXIES

Abstract

ABSTRACT. In a recent paper (ref. [1]) this author proved that the radio communications among any pair of stars within our Galaxy are feasible with modest transmitted powers if the gravitational lenses of both stars are exploited. In the present paper we extend those innovative results to the case of radio communications among nearby galaxies. We show that the radio communications among galaxies may become feasible if the black holes located at the center of galaxies, are exploited as gravitational lenses. In other words, a massive black hole may be regarded as a huge focussing device for radio waves being transmitted out of that galaxy and/or being received from another galaxy. This happens because a black hole is such a highly massive and compact object that all electromagnetic waves flying by its surface are highly deflected by its gravitational field and made to focus at a comparatively short distance from the black hole itself. Next we consider the possibility of building radio bridges between our own Galaxy (the Milky Way) and other nearby galaxies. This possibility is serious because, since 1974, astronomers have come to known that a supermassive black hole called Sagittarius A* does exist at the center of our Galaxy. In 2002 its mass was estimated to be of the order of 2.6 million solar masses, and in 2008 this estimate was increased to 4.31 million solar masses. We show mathematically that at least five radio bridges may be created between SgrA* and the respective supermassive black holes located at the center of five nearby galaxies.

The conclusion that we draw from the mathematics describing all these radio bridges is surprising: they all perform better that the "short" Sun-Alpha Cen A radio bridge, first studied in detail by this author in ref. [1]. In other words, the powers necessary to keep the radio link between SgrA* and all the above big black holes located in other nearby galaxies are smaller than the powers requested to keep the radio bridge between the Sun and Alpha Cen A. This unexpected new result might have profound consequences on SETI, inasmuch as SETI signals reaching us from other galaxies may not be ruled out any more.

REFERENCE

[1] C. Maccone, "Interstellar radio links enhanced by exploiting the Sun as a Gravitational Lens", Acta Astronautica, Vol. 68 (2011), pages 76-84.