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THE TITANS OF THE UNIVERSE: RECONSTRUCTING THE HISTORY OF ACCRETION OF THE SUPERMASSIVE BLACK HOLES

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Nowadays, it is known that almost all galaxies have into their center a black hole with mass of thousands or billion of solar mass. However, the origin and evolution of these objects is not completely understood. In this work we study the accretion process of super massive black holes having as base the evolution history of the dimensionless mean accretion rate, weighted by Eddington luminosity, $\bar{\lambda}$. We use the Sloan Digital Sky Survey (SDSS) data release 7 (DR7) and the Catalog of Quasar Properties from SDSS DR7 [1]. Different of other works, here we determine the evolution of $\bar{\lambda}$ not only in redshift bins ($0.0 \leq z \leq 4.5$), but also for bins of mass ($10^{7.5} - 10^{10}$ $M_{\odot}$). The $\bar{\lambda}$ was represented by double exponential (one in z and another in m_{bh}) like Schechter parametric function, been that the parameters were determined using maximum likelihood estimation method. In this work we assume that the mean radiative efficiency of accretion disk is constant and that its value is $\bar{\eta} = 0.1$. We observe that the accretion rate peaks at redshift $z \sim 4.5$ and it reaches maximum value for black holes with $\sim 10^9 M_{\odot}$. The accretion rate behavior, in bins of mass, is similar to a Gaussian that peaks at $140 M_{\odot} yr^{-1}$, and it is a linear function up to redshift ~ 4.5.

[1] See https://www.cfa.harvard.edu/∼yshen/BH_mass/dr7.htm for more details