The first luminous objects in the Universe

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One topic two sources

- The first SMBH
- The first stars (GRBs)

Formation of first galaxies/BH

- ***SDSS QSO z>6 => M_{BH}~3-7×$10^9 M_{Sun}$***
- $\log M_{BH}=(8.2\pm0.1)+(1.1\pm0.1)(\log LK,bul-10.9)$, $\log M_{BH}=(8.3\pm0.1)+(4.1\pm0.3)(\log\sigma-2.3)$
- **Locally M_{BH}~0.001×M_{bulge} what happens at high-z?**
- Early AGN activity can affect structure formation through eating of the IGM.
- Contribution to reionization.
- **Three additional key issues:**
  - ***Which are the seeds of SMBH?*** ~100M_{Sun} BH from PopIII stars or 10^3-10^6 M_{Sun} BH from direct collapse of gas clouds?
  - If SMBH grow-up by hierarchical merging and accretion, they can be used to probe the ***physics of accretion and AGN triggering mechanisms***
  - Forming $10^{9\text{-}10}M_{Sun}$ BHs and $10^{11\text{-}12}M_{sun}$ bulges at z>6 can be a challenge for models of structure formation. As well as forming metals and dust. SMBH can then be used to: ***constrain cosmological scenarios***