



**Chandra X-ray
Observatory Center**

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Quasar Survey: About 1,600 rapidly growing black holes located up to 12.7 billion light years from Earth.

(Credit: Illustration: NASA/CXC/M.Weiss; X-ray: NASA/CXC/Univ. of Florence/G.Risaliti & E.Lusso)

Caption: A new study using Chandra, XMM-Newton and Sloan Digital Sky Survey (SDSS) data suggests that dark energy may have varied over cosmic time. This artist's illustration helps explain how astronomers tracked the effects of dark energy to about one billion years after the Big Bang by determining the distances to nearly 1,600 quasars, rapidly growing black holes that shine extremely brightly. Two of the most distant quasars studied are shown in Chandra images in the insets.

Chandra X-ray Observatory ACIS Image

CXC operated for NASA by the Smithsonian Astrophysical Observatory