Lyman-Break Galaxies in the Epoch of Reionization

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SFRH / BPD / 89554 / 2012 ; PEst-OE/FIS/UI2751/2011 ; PTDC/FIS-AST/2194/2012



~400,000 years: "Dark ages" begin

~200 million years: Stars and nascent galaxies form

~1 billion years: Reionization ends

~9.2 billion years: Sun, Earth, and solar system have formed

• 13.7 billion years: Present

Galaxiestorm

Gunn-Peterson effect





Fan et al. (2006), AJ 132 117

A

Lyman-break technique











	5- σ depths (AB magnitudes)		
	Y-band	J-band	H-band
XDF	29.2	29.0	29.0
IUDF09-2	28.5	28.6	28.4
IUDF09-I	28.2	28.5	27.2
ERS	27.0	27.4	27.1
CANDELS DEEP	27.8	27.3	27.2
CANDELS WIDE	26.8	26.9	26.6

CANDELS

XDF filters





Selection criteria



- >5σ detection in two bands longwards of the break
- $<2\sigma$ non-detection in optic bands
- colour criteria

LF evolution



Implications for reionization







...and beyond!





z > 10.5

Close pairs





GOODS-North GOODS-South

Elbert et al., MNRAS submitted

Summary

LF evolution: clear from z = 3evidence for evolution from $z \sim 7$ to $z \sim 8$ both in ϕ^* and M*

Reionization:

candidates we detect have insufficient flux for reionization, but a steep faint end slope, low metallicity population and a top-heavy IMF could all be factors that might provide enough ionizing photons.

Cosmic variance: within the expected Poisson noise compatible with theoretical predictions