# Constraints on the identity of dark matter with strong lensing

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#### COCO simulations Bose+ 2016

# Subhalo detection with strong lensing



Vegetti et al. 2012

# Subhalo mass function in COCO



## Monte Carlo simulation



#### Constraints with NIens=100, MIow=10<sup>7</sup> Msun



### How many subhaloes do we



## Sensitivity function



Li et al in preparation

### Forecast for Hubble-like imaging survey

- Assuming M200=1e13 Msun
- Nlens=1000, using SLAC sensitivity maps
- 19 subhaloes detected
- Almost no constraints on the lower limit of m\_c



Li et al in preparation

# Mlow vs. Nlens

- Black: N=1000, SLAC like survey. Detected subhalo=19
- Red N=100 (TMT like), Mlow=0.1xMlow\_SLAC, Detected subhalo=12
- Dashed vertical line: m\_c of COCO-WARM



Li et al in preparation

#### Subhalo mass determination





# Summary

- Subhaloes detected from Einstein ring systems provides a promising way to distinguish WDM and CDM model.
- Decreasing M\_low is much more important than increase Nlens
- Euclid can find ~10^5 lenses. For TMT: 100 lenses with M\_low=10e7 Msun, can easily rule out 3.3keV WDM.
- We need more tests on mass determination.