

Theory (future observable)

Observable

Observable

Observable

SMBHB Mass  
Function  
 $\phi_{\text{BHB}}(M_{\text{BH}}, z)$

SMBH Mass  
Function  
 $\phi_{\text{BH}}(M_{\text{BH}}, z)$

Binary Quasar  
Mass Function  
 $\phi_{\text{BQ}}(M_{\text{BH}}, z)$

Quasar Mass  
Function  
 $\phi_{\text{Q}}(M_{\text{BH}}, z)$



Binary Occupation  
Fraction  
 $\mathcal{F}_{\text{BHB}}(M_{\text{BH}}, z)$

Binary Occupation  
Fraction of Quasars  
 $\mathcal{F}_{\text{BHB}|\text{QSO}}(M_{\text{BH}}, z)$



Do quasars signpost SMBHBs?

$$\frac{\mathcal{F}_{\text{BHB}|\text{QSO}}(M_{\text{BH}}, z)}{\mathcal{F}_{\text{BHB}}(M_{\text{BH}}, z)} \begin{cases} > 1, \text{ yes} \\ = 1, \text{ maybe} \\ < 1, \text{ no} \end{cases}$$