IPMU INSTITUTE FOR THE PHYSICS AND MATHEMATICS OF THE UNIVERSE

UNIVERSITY OF OXFORD

Finding the chiral GWB of an axion-SU(2) inflationary model

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B-modes from space, UC Berkeley, 02/12/17

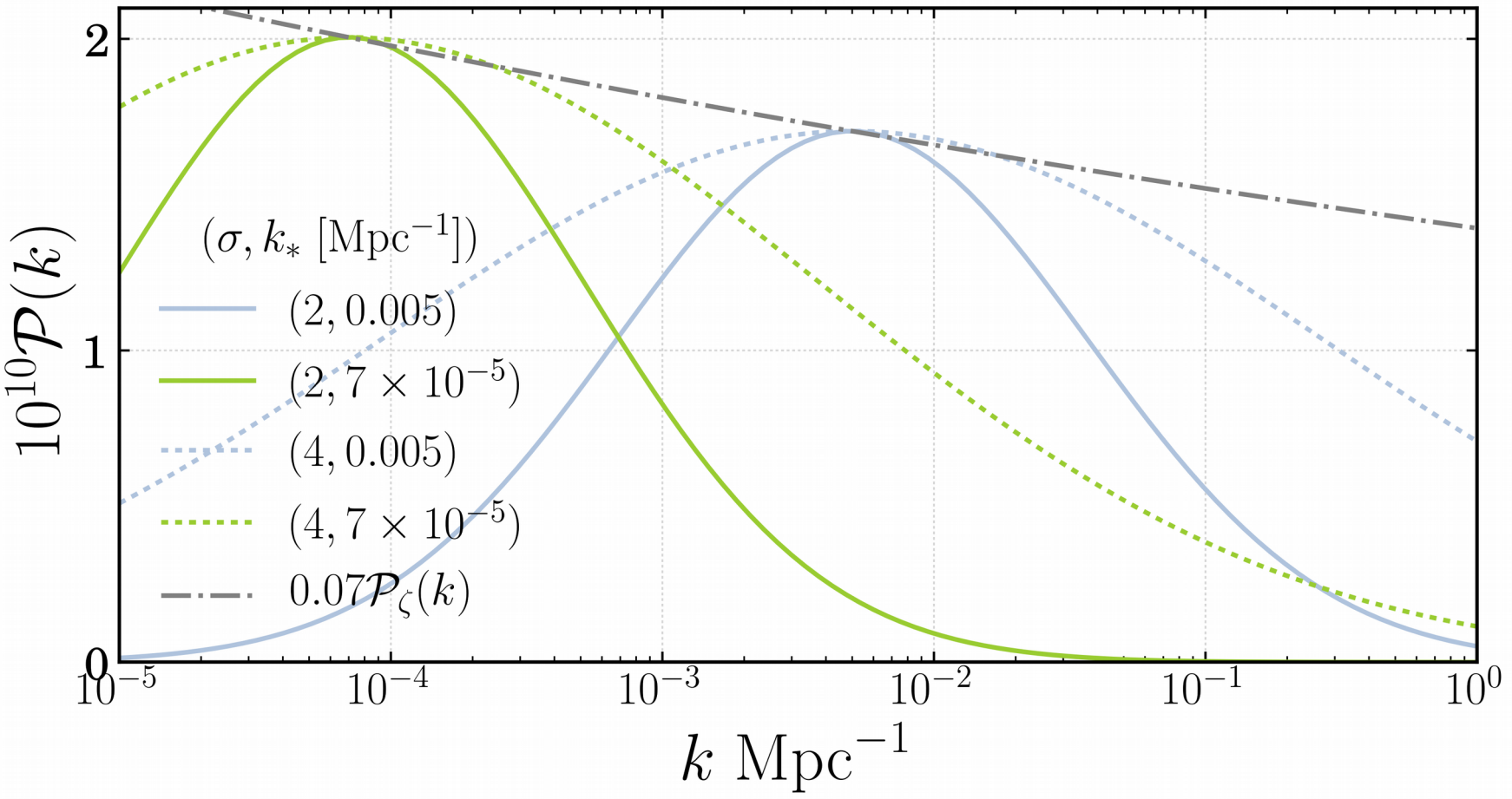
Intro

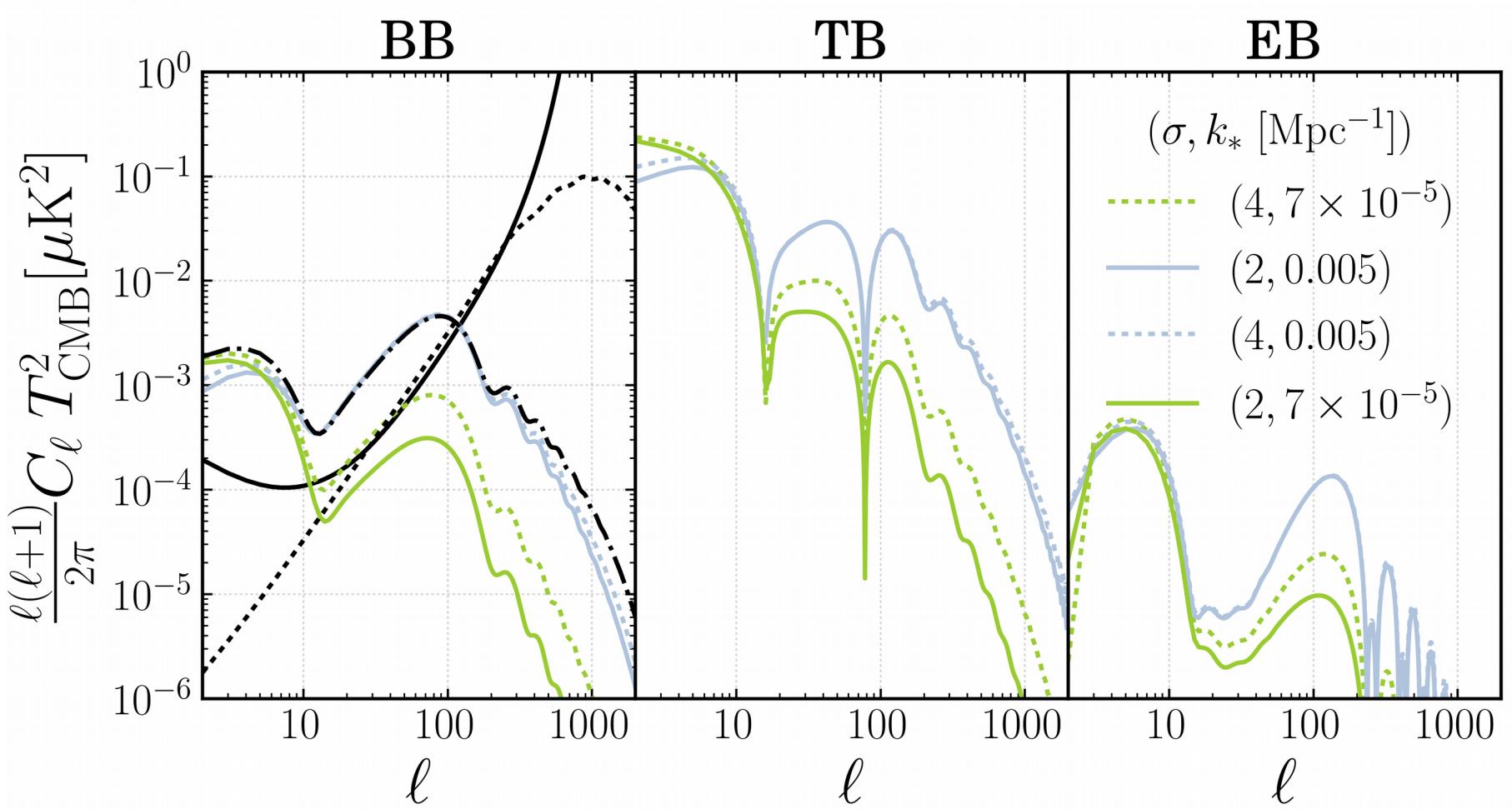
GWBs can be sourced by gauge fields present during inflation:

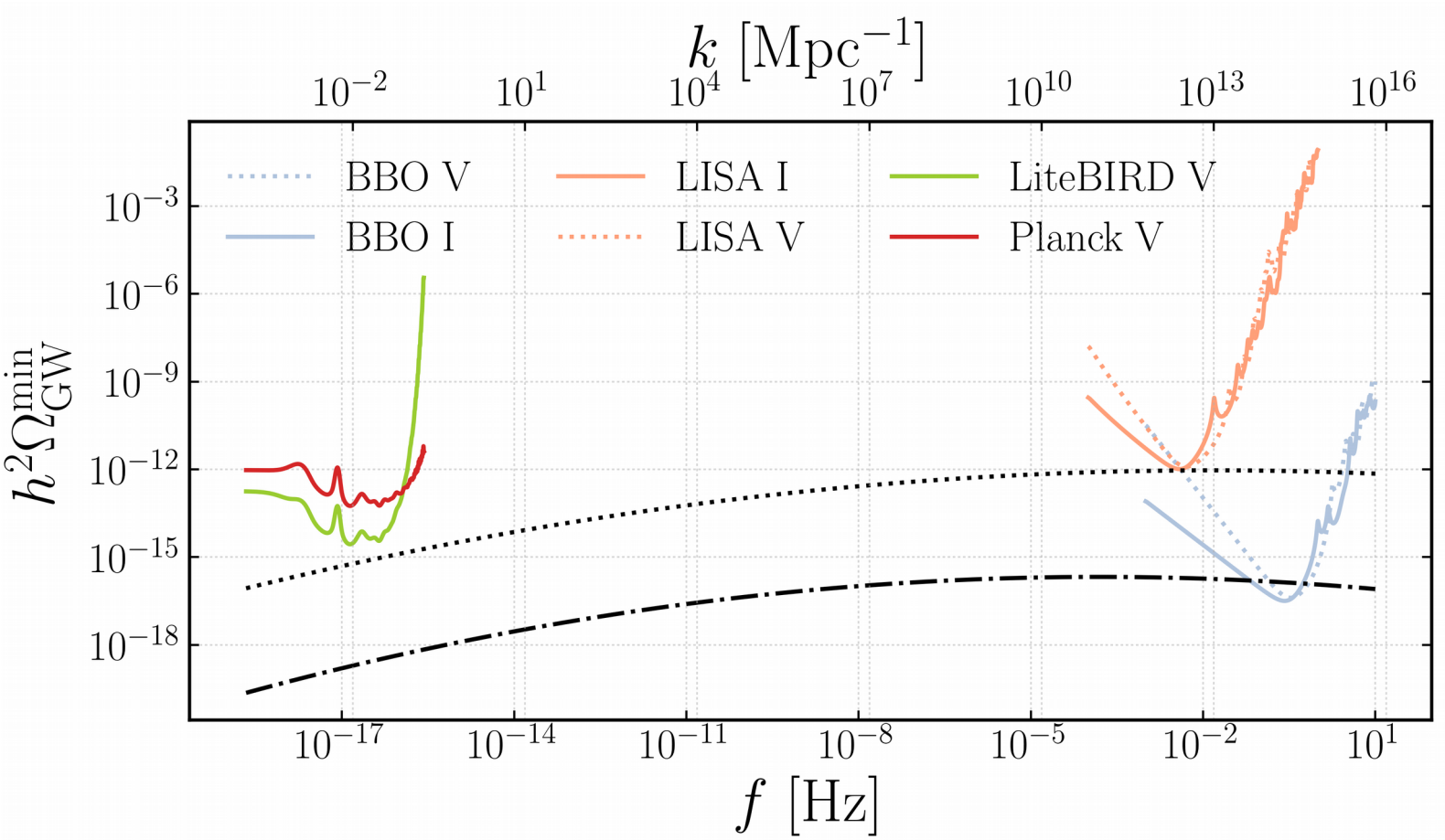
Characteristic of $\mathcal{P}^{\rm GW}(k)$	**Observable**
Circularly polarized	$C_\ell^{\rm TB/EB} \neq 0$
Scale-dependent	Power at interferometer scales $n_T \neq -r/8$
Non-Gaussian	$\langle a^X_{\ell_1 m_1} a^Y_{\ell_2 m_2} a^Z_{\ell_3 m_3} \rangle$

Approximate parameterization:

$$\mathcal{P}_X^{\rm GW}(k) = \begin{cases} r\mathcal{P}_\zeta(k) \exp\left[-\frac{1}{2}\frac{\ln(k/k_*)^2}{\sigma^2}\right], & X = L \\ 0, & X = R \end{cases}$$


$10^{10}\mathcal{P}(k)$
k Mpc^{-1}
$(\sigma, k_*\ [\mathrm{Mpc}^{-1}])$
$(2, 0.005)$
$(2, 7\times10^{-5})$
$(4, 0.005)$
$(4, 7\times10^{-5})$
$0.07\mathcal{P}_\zeta(k)$
0
1
2
10^{-5}
10^{-4}
10^{-3}
10^{-2}
10^{-1}
10^{0}


BB
TB
EB
$\frac{\ell(\ell+1)}{2\pi} C_\ell \; T^2_{\rm CMB} [\mu {\rm K}^2]$
10^0
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10
100
1000
ℓ
$(\sigma, k_*\ [{\rm Mpc}^{-1}])$
$(4, 7\times10^{-5})$
$(2, 0.005)$
$(4, 0.005)$
$(2, 7\times10^{-5})$


k [Mpc^{-1}]
10^{-2}
10^{1}
10^{4}
10^{7}
10^{10}
10^{13}
10^{16}
BBO V
BBO I
LISA I
LISA V
LiteBIRD V
Planck V
$h^2\Omega_{\rm GW}^{\rm min}$
10^{-3}
10^{-6}
10^{-9}
10^{-12}
10^{-15}
10^{-18}
10^{-17}
10^{-14}
10^{-11}
10^{-8}
10^{-5}
10^{-2}
10^{1}
f [Hz]