



# $B_{(s)}^{(*)}$ and $D_{(s)}^{(*)}$ Decay Constants from Lattice QCD using the Heavy-HISQ Method

Kerr Miller

University of Glasgow  
HPQCD

14th July 2023



$B_{(s)}^{(*)}$  and  $D_{(s)}^{(*)}$  Decay Constants from  
Lattice QCD using the Heavy-HISQ  
Method

$$B_{(s)}^{(*)} \text{ and } D_{(s)}^{(*)}$$

► Heavy-light mesons

Meson	Valence flavours	$J^P$	Mass
$B_{(s)}$	$b, u/d/s$	$0^-$	$\approx 5.3 \text{ GeV}$
$B_{(s)}^*$		$1^-$	
$D_{(s)}$	$c, u/d/s$	$0^-$	$\approx 2 \text{ GeV}$
$D_{(s)}^*$		$1^-$	

Table: Summary of meson properties.



$B_{(s)}^{(*)}$  and  $D_{(s)}^{(*)}$  Decay Constants from  
Lattice QCD using the Heavy-HISQ  
Method

# Decay Constants

Continuum pseudoscalar, vector and tensor decay constants  
(for heavy meson  $H_{(s)}^{(*)}$ ):

$$\begin{aligned}\langle 0 | A_{\mu}^{(s)} | H_{(s)}(p) \rangle &\equiv p_{\mu} f_{H_{(s)}}, & A_{\mu}^{(s)} &= \bar{q} \gamma_{\mu} \gamma_5 h, \\ \langle 0 | V_{\mu}^{(s)} | H_{(s)}^{*}(p) \rangle &\equiv M_{H_{(s)}^{*}} f_{H_{(s)}^{*}} \epsilon_{\mu}(p), & V_{\mu}^{(s)} &= \bar{q} \gamma_{\mu} h, \\ \langle 0 | Z_T^{\overline{MS}} T_{\alpha\beta}^{(s)} | H_{(s)}^{*}(p) \rangle &\equiv i f_{H_{(s)}^{*}}^T (\epsilon_{\alpha} p_{\beta} - \epsilon_{\beta} p_{\alpha}), & T_{\alpha\beta}^{(s)} &= \bar{q} \sigma_{\alpha\beta} h.\end{aligned}$$



$B_{(s)}^{(*)}$  and  $D_{(s)}^{(*)}$  Decay Constants from  
Lattice QCD using the Heavy-HISQ  
Method



# Invitation

For further details, check out my poster and/or come and have a chat with me!



Thank you for your time.  
Please do check out my poster if you haven't already!

Quick questions?