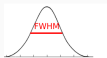


# Configuration used for training

## Gun Phase

### Solenoids:

- IBF (Buck Focusing)
- IM (Matching)



Design variables  
(= Input for the surrogate model)

Gun

25 MV

LinAc 1

25 MV

LinAc 2

24 MV

LinAc 3

25 MV

LinAc 4

8.2 MV

LinAc 5

8.3 MV

LinAc 6

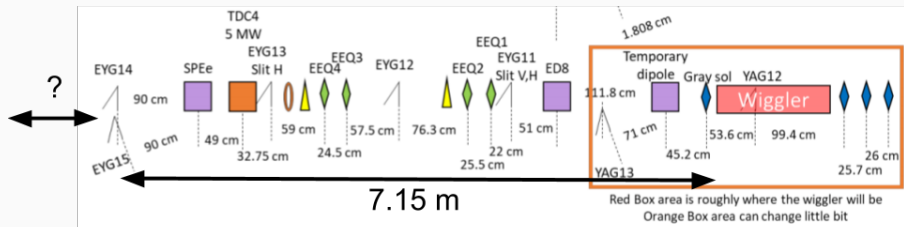
0 m

1 m

Used to train the model

13.7 m

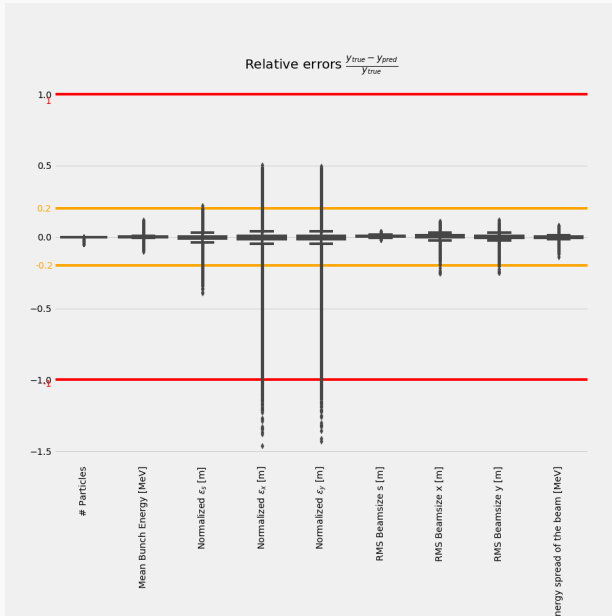
# Beamline Elements Position



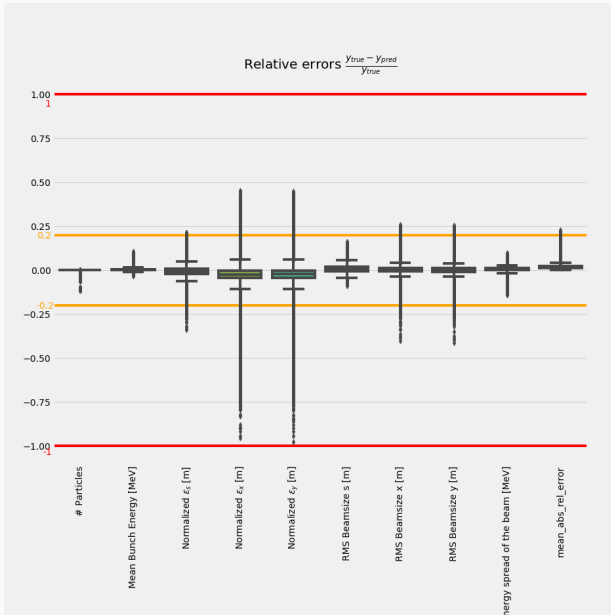
## Design variables

Bound	IBF [A]	IM [A]	Gun Phase [deg]	FWHM [ps]
Lower Bound	200	170	-30	1.5
Upper Bound	500	260	0	10

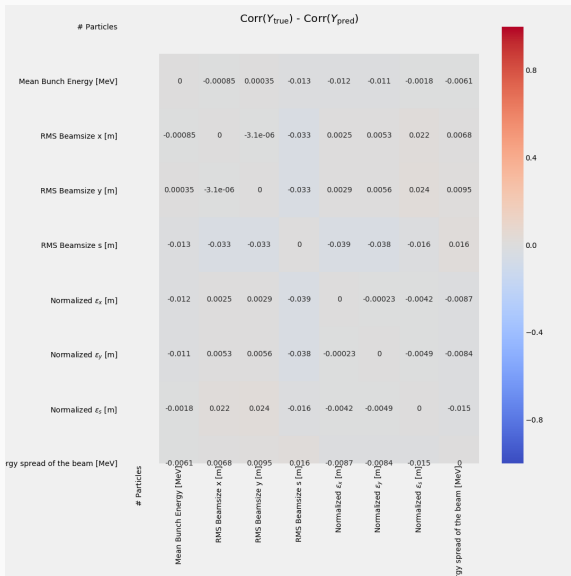
# Model performance I: Before



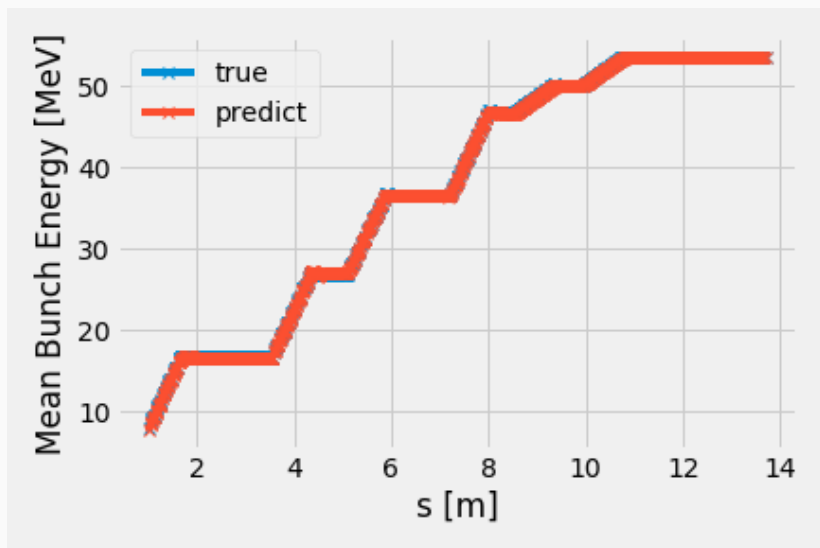
# Model performance I: Now



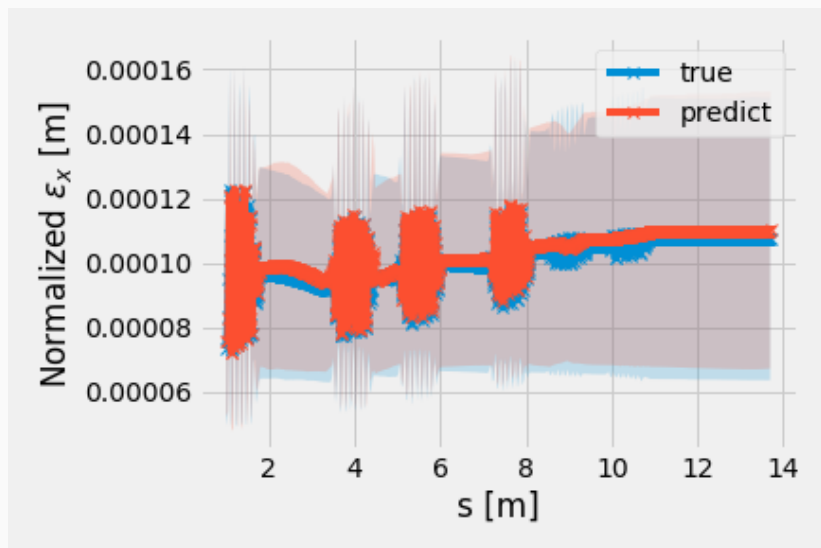
# Model performance II: Correlations



## Model performance III

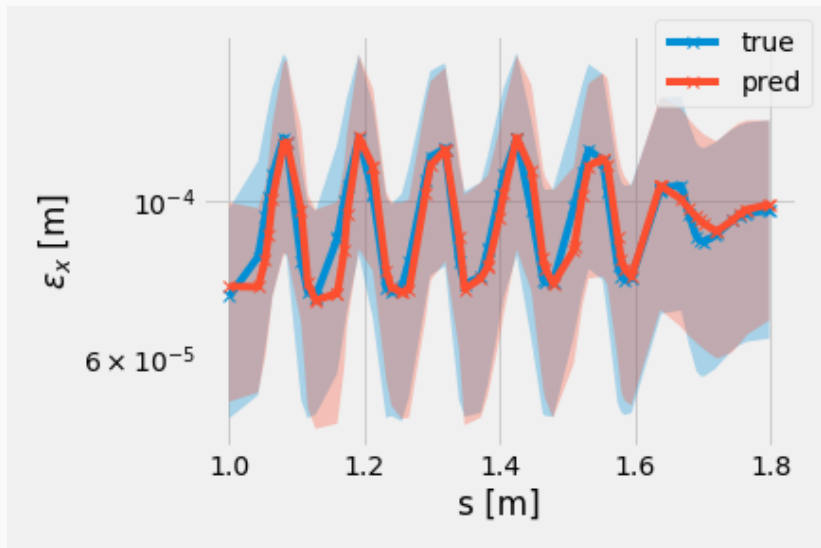


## Model performance III



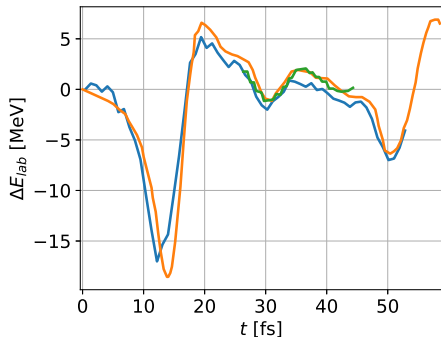


## Model performance III: Details (inside first cavity)



# Benchmark OPAL Wiggler (full-wave solver)

$K = 51.5$ ,  $Q = 200\text{pC}$ ,  $E = 3.95\text{GeV}$ ,  $\lambda_r = 3.9\ \mu\text{m}$ ,  $L_u = 2.1\ \text{m}$ ,  $\lambda_u = 35\ \text{cm}$



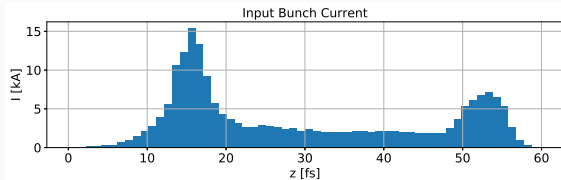
— OPAL  
— Osiris (paper)  
— Measurement at LCLS (paper)

screen at = 2.2 m from wiggler begin

Source paper: J. MacArthur et al.,

*Phase-Stable Self-Modulation of an  
Electron-Beam in a Magnetic Wiggler,*

arXiv:1909.02166 [physics.acc-ph], (2019).



# Benchmark OPAL Wiggler (full-wave solver)

