

# Energy loss due to wakes in the undulator

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XFEL Beam Dynamics Meeting

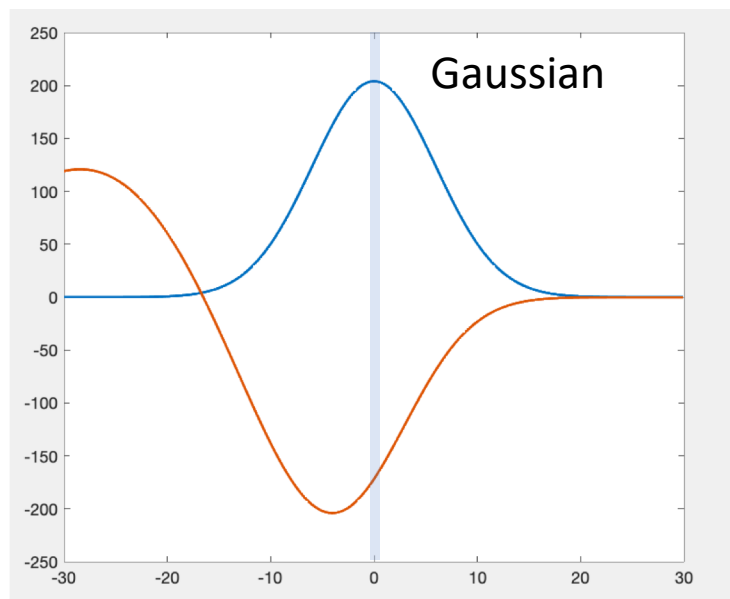
DESY, Hamburg

9.06.20

## Motivation

- What is the energy loss due to the wakes to be compensated with a linear taper?
- Different peak currents: 3 – 5 - 7 kA.
- Different shapes: Gaussian – rectangular – triangular (raising) – triangular(falling).

$\Delta E$  [keV]

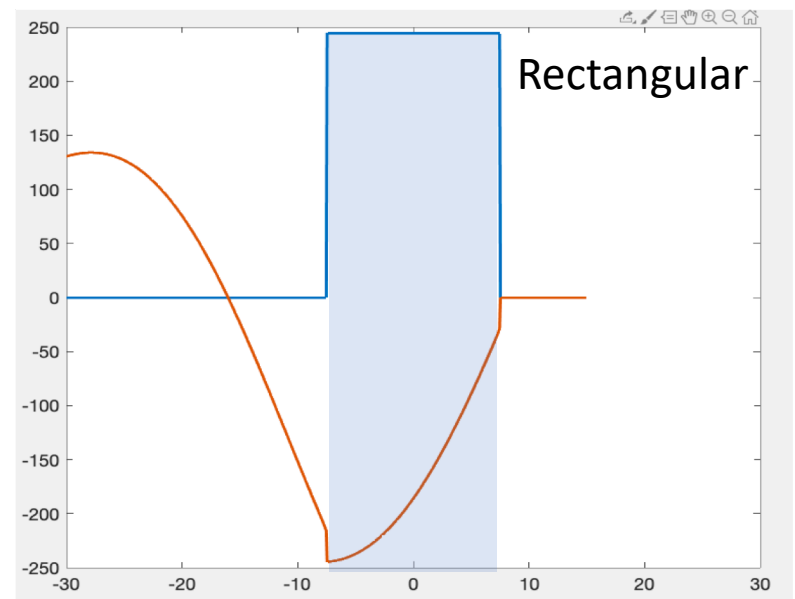


Gaussian

$s$  [ $\mu\text{m}$ ]

5 kA

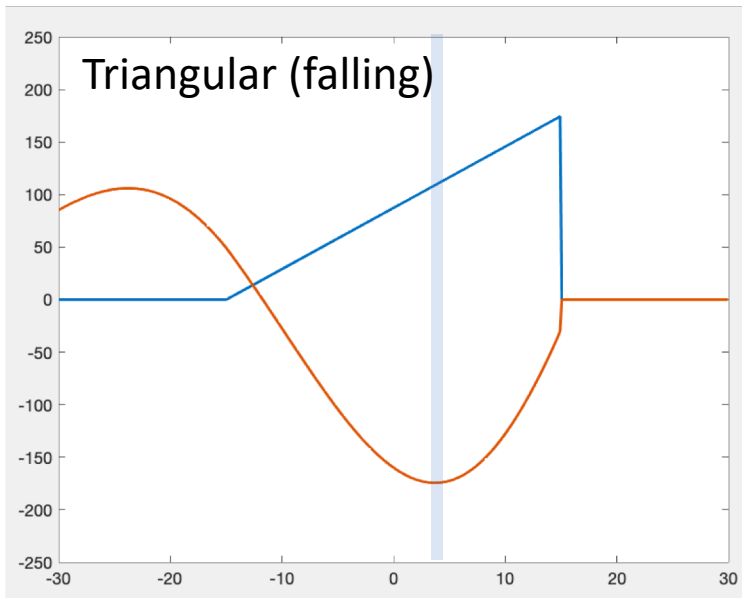
$\Delta E$  [keV]



Rectangular

$s$  [ $\mu\text{m}$ ]

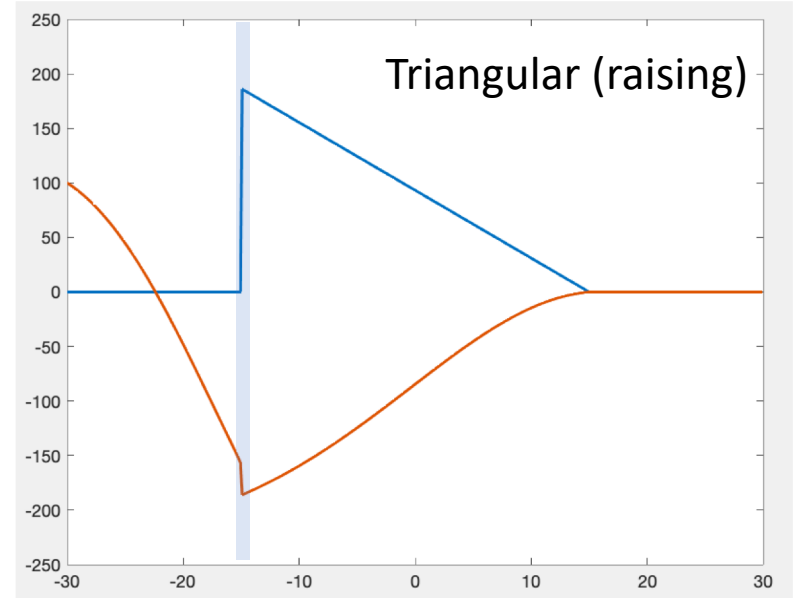
$\Delta E$  [keV]



Triangular (falling)

$s$  [ $\mu\text{m}$ ]

$\Delta E$  [keV]



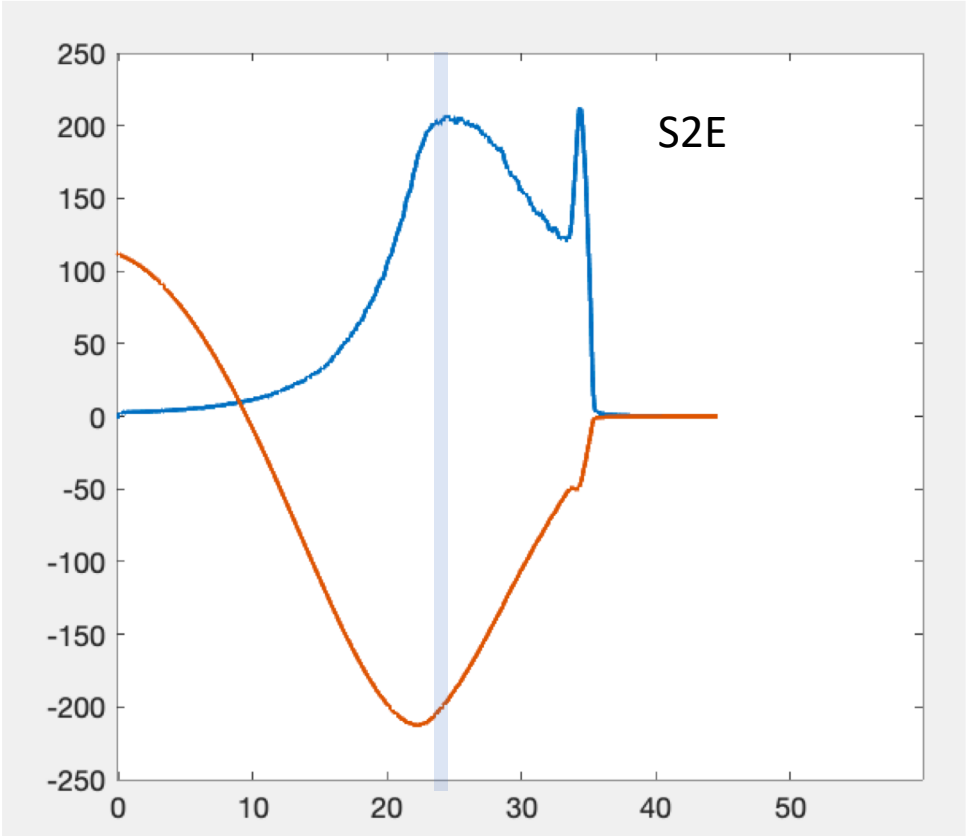
Triangular (raising)

$s$  [ $\mu\text{m}$ ]

# Energy loss to compensate (keV/m)

Peak current, kA	Gauss	Rectangular	Triangular (falling)	Triangular (raising)	S2E
3	121	115	119	86	
5	<b>172</b>	<b>170</b>	<b>174</b>	<b>186</b>	<b>195</b>
7	200	198	216	264	

$\Delta E$  [keV]



$s$  [ $\mu\text{m}$ ]