

# Equations for EDM screen

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<i>HV</i>	<i>hel.</i>	<i>crystal</i>	<i>pol.</i>	<i>direction</i>	<i>equation</i>
1	+	1	+	+z1,+U	$V_1 = V_{\lambda/4} + V_{\alpha,1} + V_{PITA,1} + V_{\alpha pos,U} + V_{\delta pos,U}$
2	+	1	-	-z1,-U	$V_2 = -V_{\lambda/4} - V_{\alpha,1} - V_{PITA,1} + V_{\alpha pos,U} + V_{\delta pos,U}$
3	+	2	+	-z2,-V	$V_3 = V_{\lambda/4} + V_{\alpha,2} + V_{PITA,2} + V_{\alpha pos,V} + V_{\delta pos,V}$
4	+	2	-	+z2,+V	$V_4 = -V_{\lambda/4} - V_{\alpha,2} - V_{PITA,2} + V_{\alpha pos,V} + V_{\delta pos,V}$
5	-	1	-	+z1,+U	$V_5 = -V_{\lambda/4} - V_{\alpha,1} + V_{PITA,1} - V_{\alpha pos,U} + V_{\delta pos,U}$
6	-	1	+	-z1,-U	$V_6 = V_{\lambda/4} + V_{\alpha,1} - V_{PITA,1} - V_{\alpha pos,U} + V_{\delta pos,U}$
7	-	2	-	-z2,-V	$V_7 = -V_{\lambda/4} - V_{\alpha,2} + V_{PITA,2} - V_{\alpha pos,V} + V_{\delta pos,V}$
8	-	2	+	+z2,+V	$V_8 = V_{\lambda/4} + V_{\alpha,2} - V_{PITA,2} - V_{\alpha pos,V} + V_{\delta pos,V}$

Turn HV1,2...8  
into 5 params:

- Quarter wave voltage
- Alpha voltage
- PITA voltage
- Alpha-position-U voltage
- Alpha-position-V voltage

By default, we keep these equal, and combine them into to one parameter  $V_{PITA} = V_{PITA,1} =$   
 $V_{PITA,2}$ )

By default, we set

$$V_{\alpha} = V_{\alpha,1} = V_{\alpha,2}$$

By default, we typically set

$$V_{\delta pos,V} = V_{\delta pos,U} = 0.$$

## Equation reversal

**Quarter wave  
voltage**

$$V_{\lambda/4} = (V_1 - V_2 + V_3 - V_4 - V_5 + V_6 - V_7 + V_8)/8$$

**Alpha voltage**

$$V_{\alpha,1} = (V_1 - V_2 - V_5 + V_6)/4 \quad V_{\alpha,2} = (V_3 - V_4 - V_7 + V_8)/4$$

**PITA voltage**

$$V_{PITA,1} = (V_1 - V_2 + V_5 - V_6)/4 \quad V_{PITA,2} = (V_3 - V_4 + V_7 - V_8)/4$$

**Alpha-position-U  
voltage &  
Alpha-position-V  
voltage**

$$V_{\alpha pos,U} = (V_1 + V_2 - V_5 - V_6)/4 \quad V_{\alpha pos,V} = (V_3 + V_4 - V_7 - V_8)/4$$

**Delta-position  
voltages we  
typically set to  
0**

$$V_{\delta pos,U} = (V_1 + V_2 + V_5 + V_6)/4 \quad V_{\delta pos,V} = (V_3 + V_4 + V_7 + V_8)/4$$