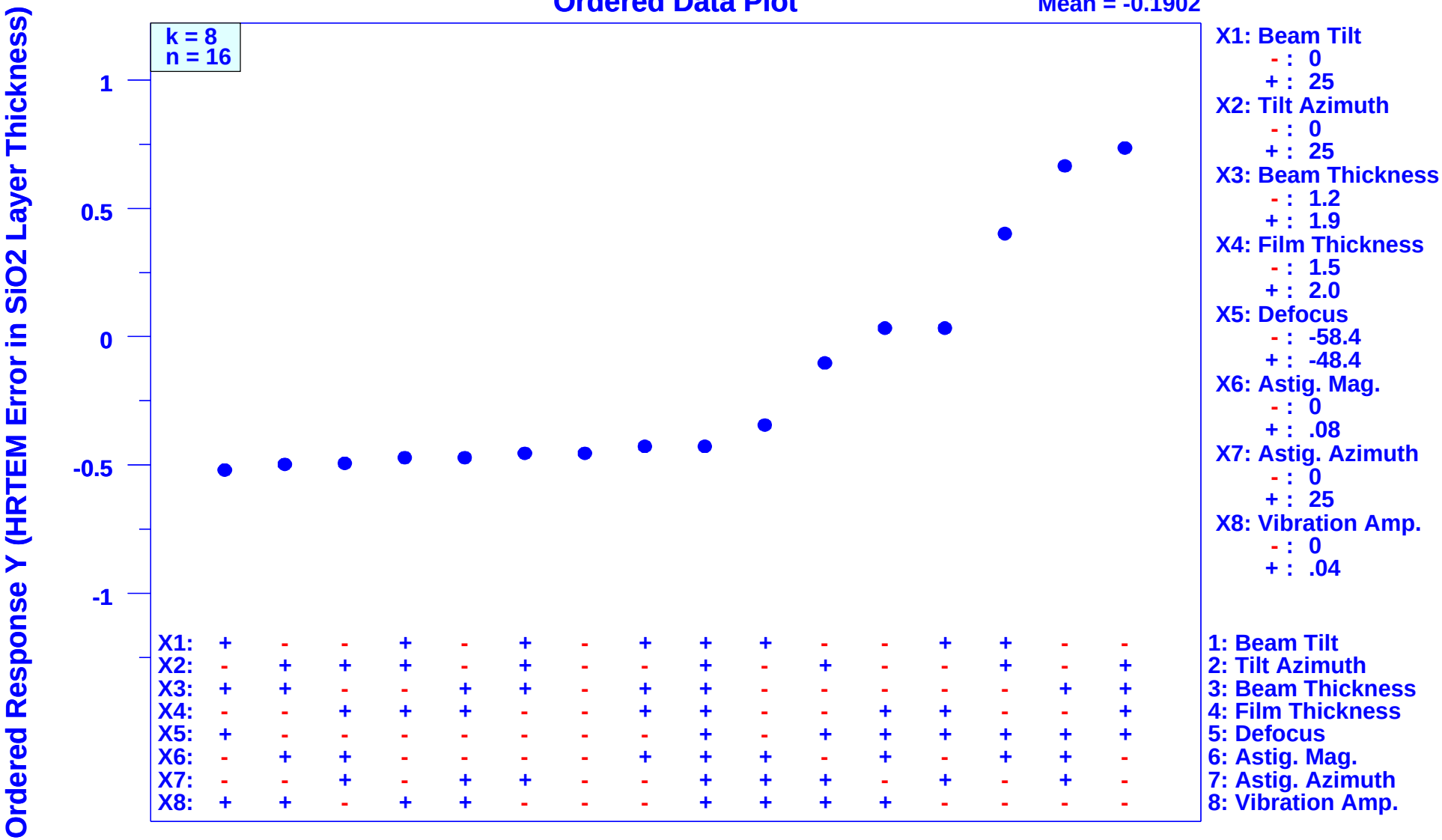
HRTEM Factors Affecting Thickness Measurements of Ultrathin Amorphous SiO2 Layer in CPU/Memory Gate Dielectrics (Nanotechnology)

Ordered Data Plot

Mean = -0.1902

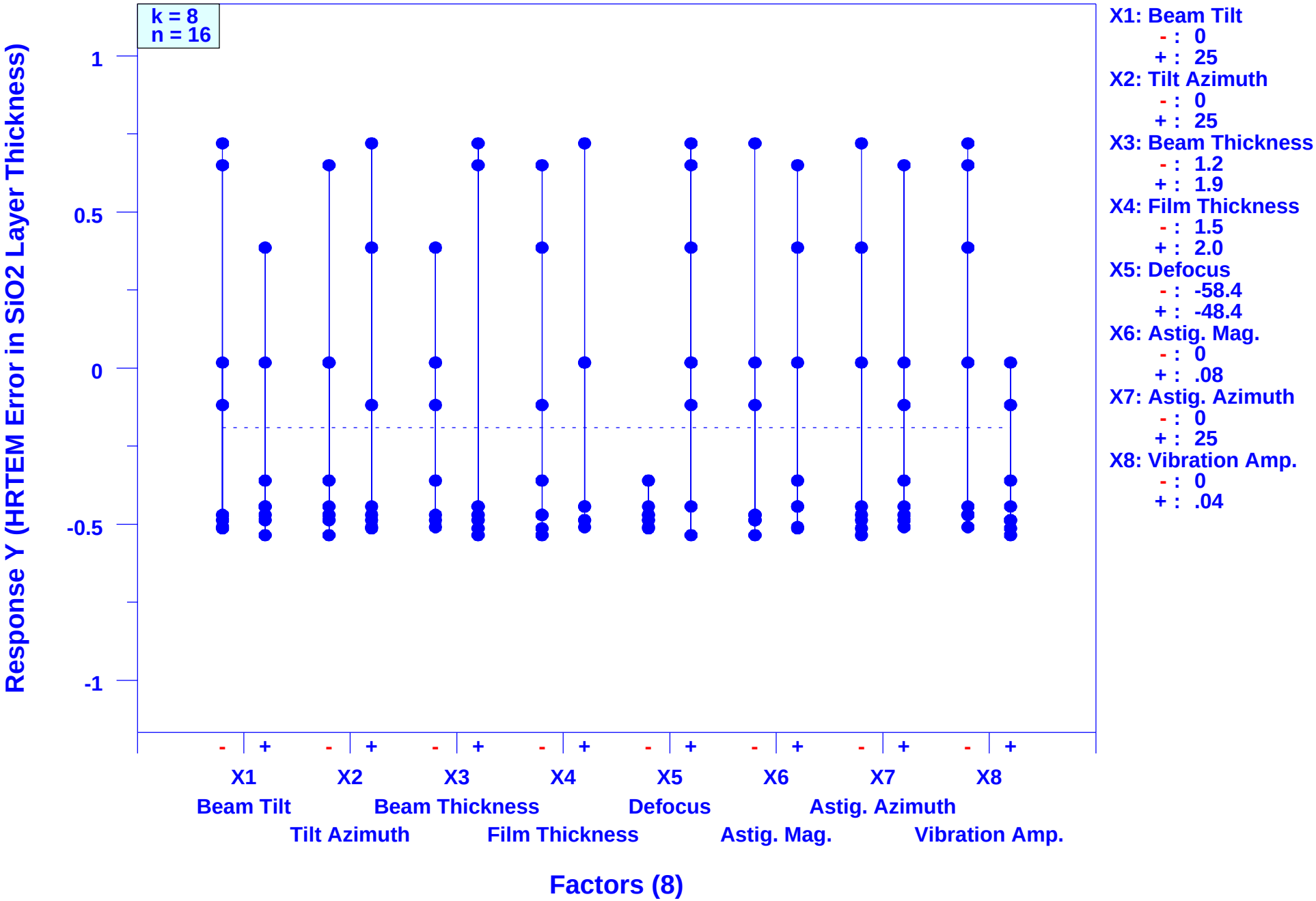


Factor Settings

HRTEM Factors Affecting Thickness Measurements of Ultrathin Amorphous SiO2 Layer in CPU/Memory Gate Dielectrics (Nanotechnology)

Scatter Plot

Mean = -0.1902



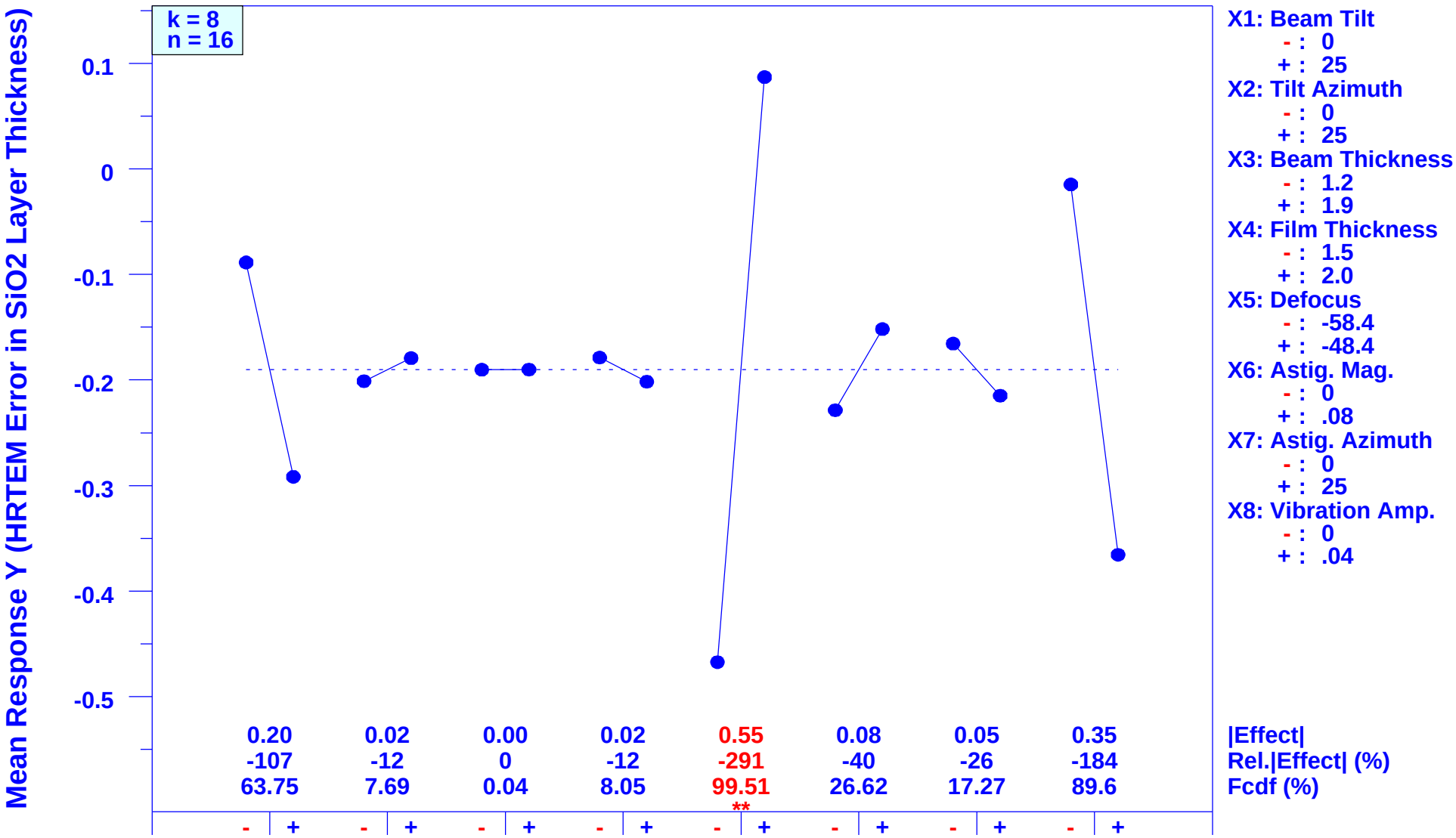
X1: Beam Tilt
- : 0
+ : 25
X2: Tilt Azimuth
- : 0
+ : 25
X3: Beam Thickness
- : 1.2
+ : 1.9
X4: Film Thickness
- : 1.5
+ : 2.0
X5: Defocus
- : -58.4
+ : -48.4
X6: Astig. Mag.
- : 0
+ : .08
X7: Astig. Azimuth
- : 0
+ : 25
X8: Vibration Amp.
- : 0
+ : .04

scott_8_16.dp

HRTEM Factors Affecting Thickness Measurements of Ultrathin Amorphous SiO2 Layer in CPU/Memory Gate Dielectrics (Nanotechnology)

Main Effects Plot

Mean = -0.1902



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+ : 25
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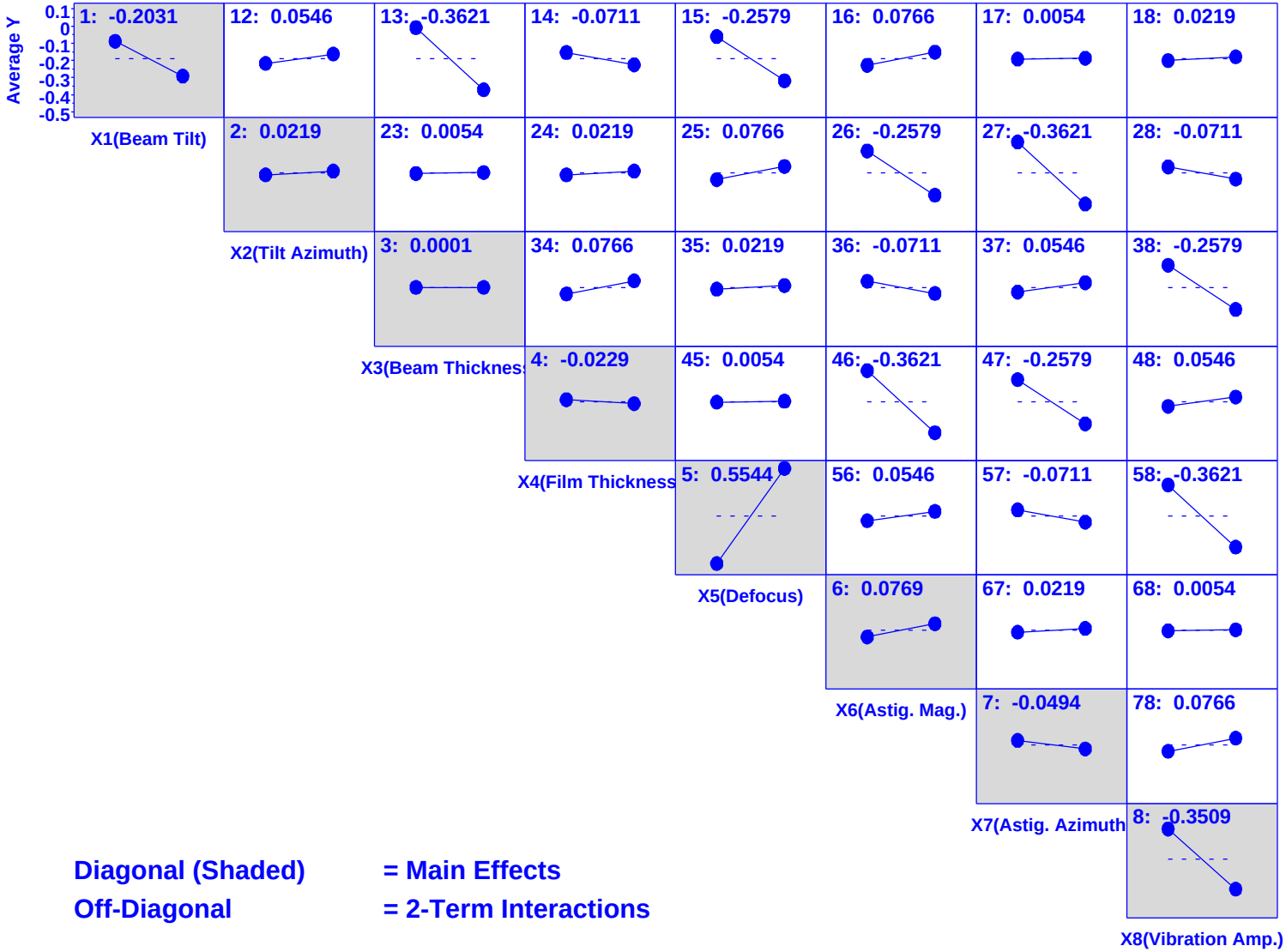
+ : 1.9
X4: Film Thickness
- : 1.5
+ : 2.0
X5: Defocus
- : -58.4
+ : -48.4
X6: Astig. Mag.
- : 0
+ : .08
X7: Astig. Azimuth
- : 0
+ : 25
X8: Vibration Amp.
- : 0
+ : .04

|Effect|
Rel.|Effect| (%)
Fcdf (%)

HRTEM Factors Affecting Thickness Measurements of Ultrathin Amorphous SiO2 Layer in CPU/Memory Gate Dielectrics (Nanotechnology)

Interaction Effects Matrix

Mean = -0.1902



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X2: Tilt Azimuth
- : 0
+ : 25

X3: Beam Thickness
- : 1.2
+ : 1.9

X4: Film Thickness
- : 1.5
+ : 2.0

X5: Defocus
- : -58.4
+ : -48.4

X6: Astig. Mag.
- : 0
+ : .08

X7: Astig. Azimuth
- : 0
+ : 25

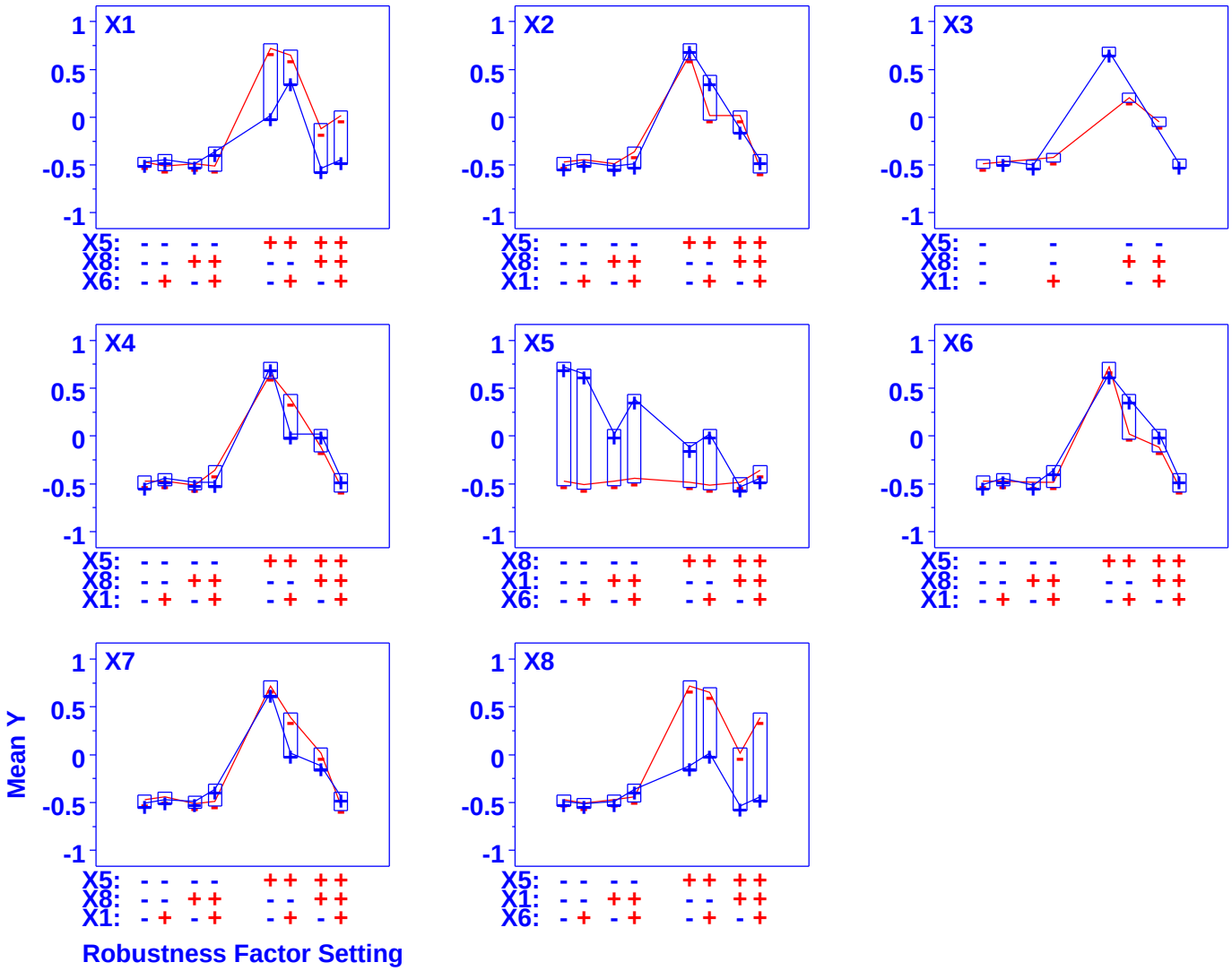
X8: Vibration Amp.
- : 0
+ : .04

Diagonal (Shaded) = Main Effects

Off-Diagonal = 2-Term Interactions

HRTEM Factors Affecting Thickness Measurements of Ultrathin Amorphous SiO2 Layer in CPU/Memory Gate Dielectrics (Nanotechnology)

Block Plot



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X2: Tilt Azimuth
- : 0
+ : 25

X3: Beam Thickness
- : 1.2
+ : 1.9

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X5: Defocus
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- : 0
+ : .08

X7: Astig. Azimuth
- : 0
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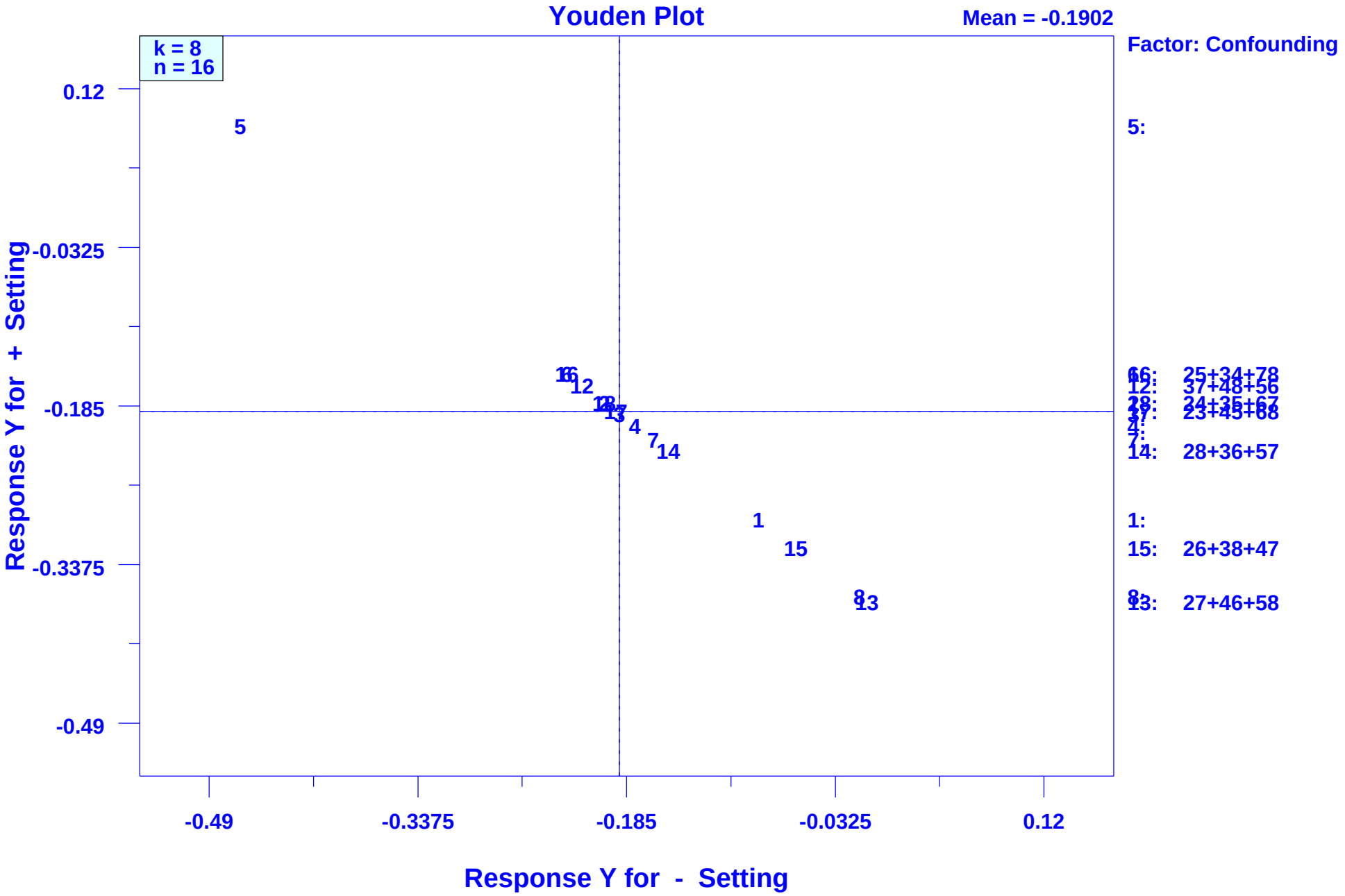
X8: Vibration Amp.
- : 0
+ : .04

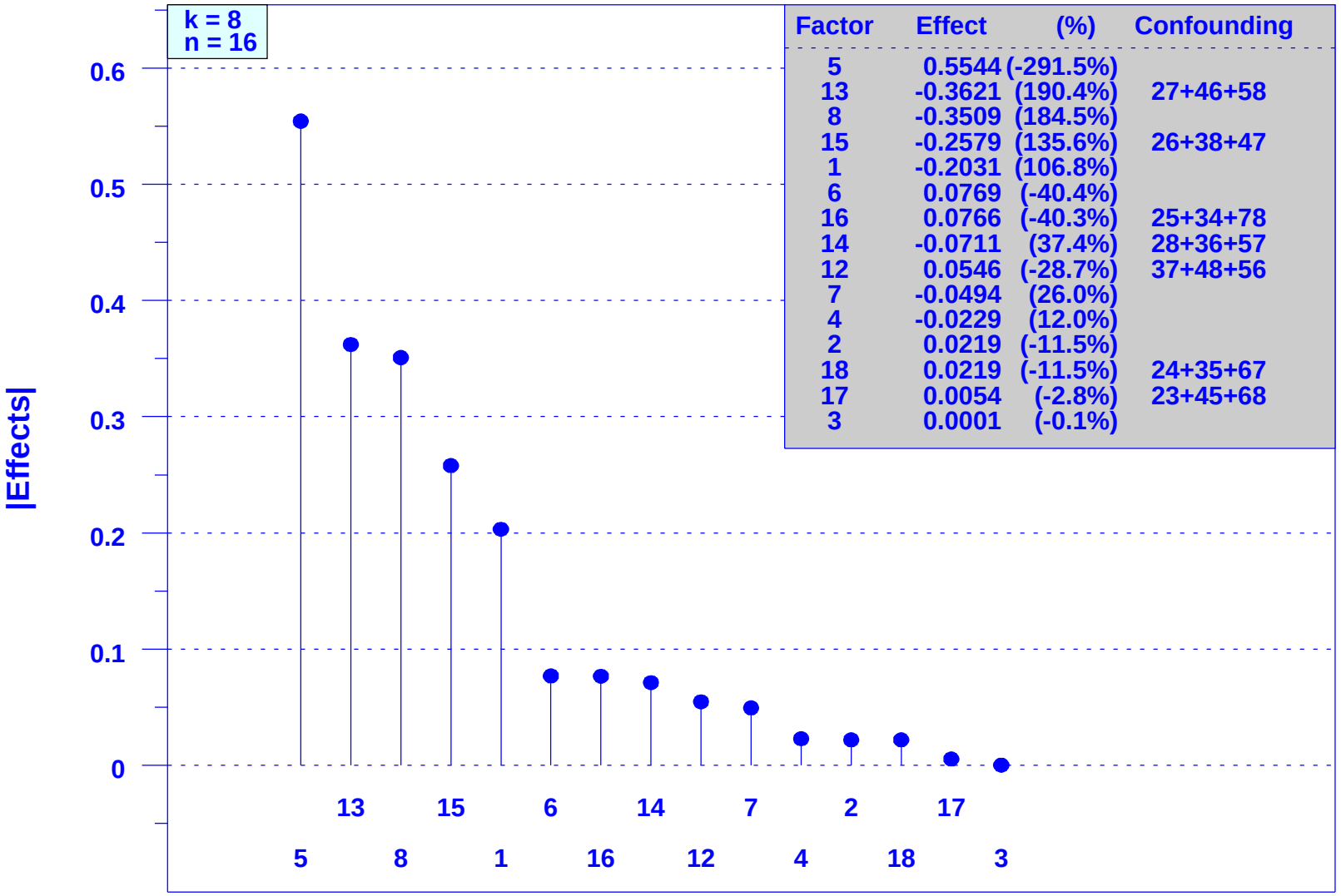
HRTEM Factors Affecting Thickness Measurements of Ultrathin Amorphous SiO2 Layer in CPU/Memory Gate Dielectrics (Nanotechnology)



HRTEM Factors Affecting Thickness Measurements of Ultrathin Amorphous SiO2 Layer in CPU/Memory Gate Dielectrics (Nanotechnology)

|Effects| Plot

Mean = -0.1902



Factor	Effect	(%)	Confounding
5	0.5544	(-291.5%)	
13	-0.3621	(190.4%)	27+46+58
8	-0.3509	(184.5%)	
15	-0.2579	(135.6%)	26+38+47
1	-0.2031	(106.8%)	
6	0.0769	(-40.4%)	
16	0.0766	(-40.3%)	25+34+78
14	-0.0711	(37.4%)	28+36+57
12	0.0546	(-28.7%)	37+48+56
7	-0.0494	(26.0%)	
4	-0.0229	(12.0%)	
2	0.0219	(-11.5%)	
18	0.0219	(-11.5%)	24+35+67
17	0.0054	(-2.8%)	23+45+68
3	0.0001	(-0.1%)	

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X2: Tilt Azimuth
- : 0
+ : 25

X3: Beam Thickness
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X4: Film Thickness
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X5: Defocus
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X6: Astig. Mag.
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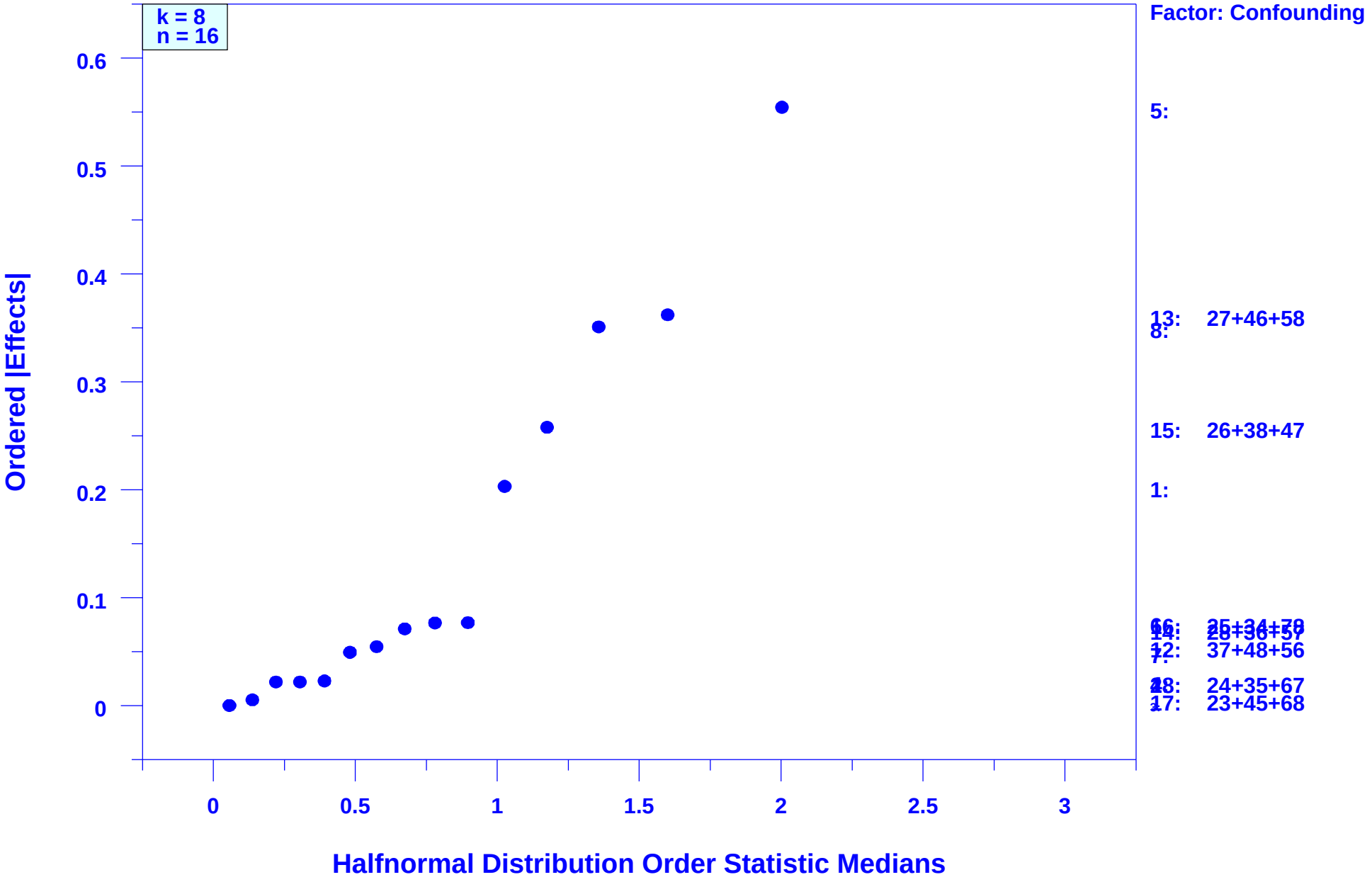
X7: Astig. Azimuth
- : 0
+ : 25

X8: Vibration Amp.
- : 0
+ : .04

HRTEM Factors Affecting Thickness Measurements of Ultrathin Amorphous SiO2 Layer in CPU/Memory Gate Dielectrics (Nanotechnology)

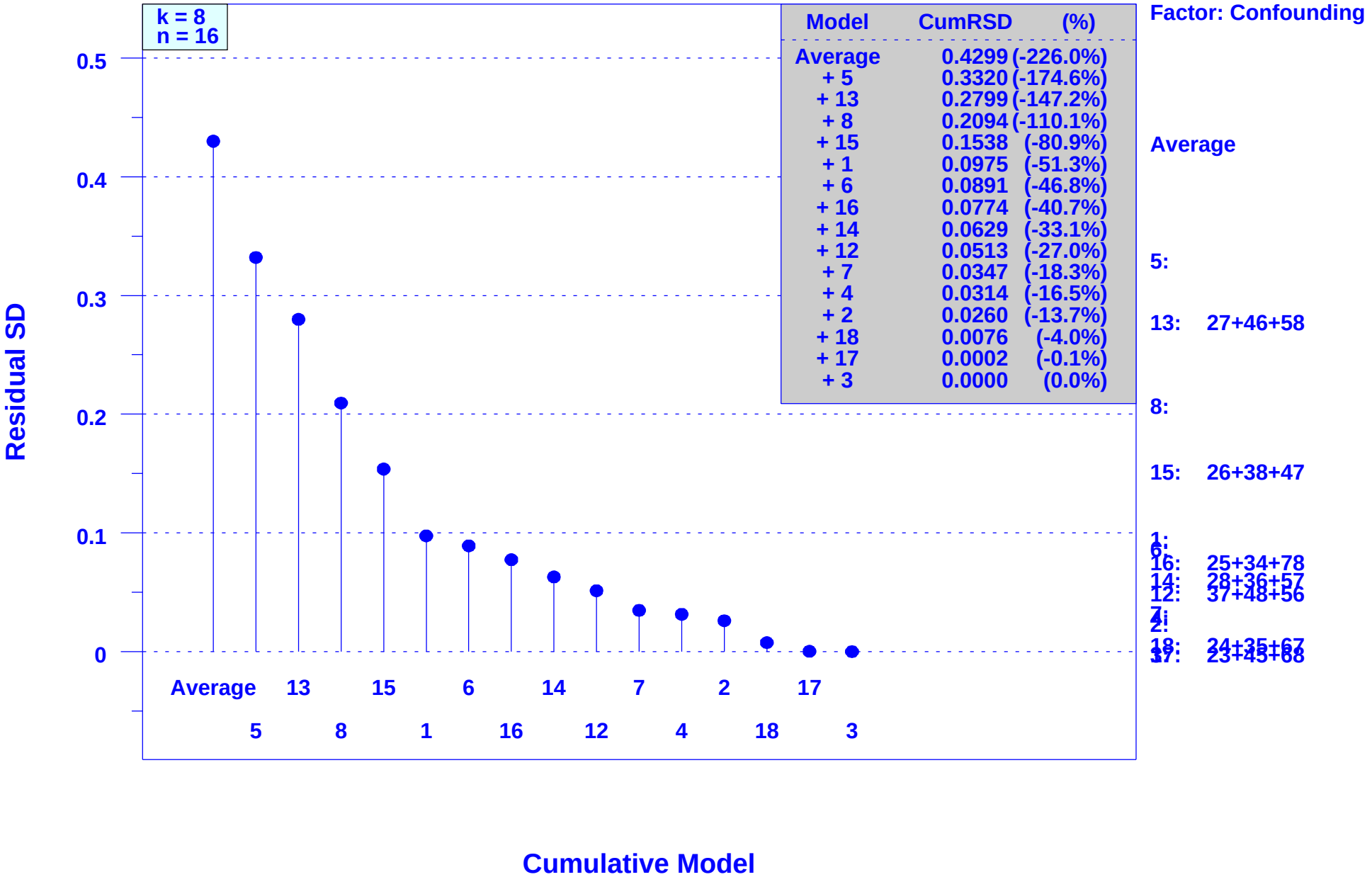
Halfnormal Probability Plot of |Effects|



HRTEM Factors Affecting Thickness Measurements of Ultrathin Amorphous SiO2 Layer in CPU/Memory Gate Dielectrics (Nanotechnology)

Cumulative Residual SD Plot

Mean = -0.1902



Model	CumRSD	(%)
Average	0.4299	(-226.0%)
+ 5	0.3320	(-174.6%)
+ 13	0.2799	(-147.2%)
+ 8	0.2094	(-110.1%)
+ 15	0.1538	(-80.9%)
+ 1	0.0975	(-51.3%)
+ 6	0.0891	(-46.8%)
+ 16	0.0774	(-40.7%)
+ 14	0.0629	(-33.1%)
+ 12	0.0513	(-27.0%)
+ 7	0.0347	(-18.3%)
+ 4	0.0314	(-16.5%)
+ 2	0.0260	(-13.7%)
+ 18	0.0076	(-4.0%)
+ 17	0.0002	(-0.1%)
+ 3	0.0000	(0.0%)

Factor: Confounding

Average

5:

13: 27+46+58

8:

15: 26+38+47

1:

6:

16: 25+34+78

14: 28+36+57

12: 37+48+56

7:

4:

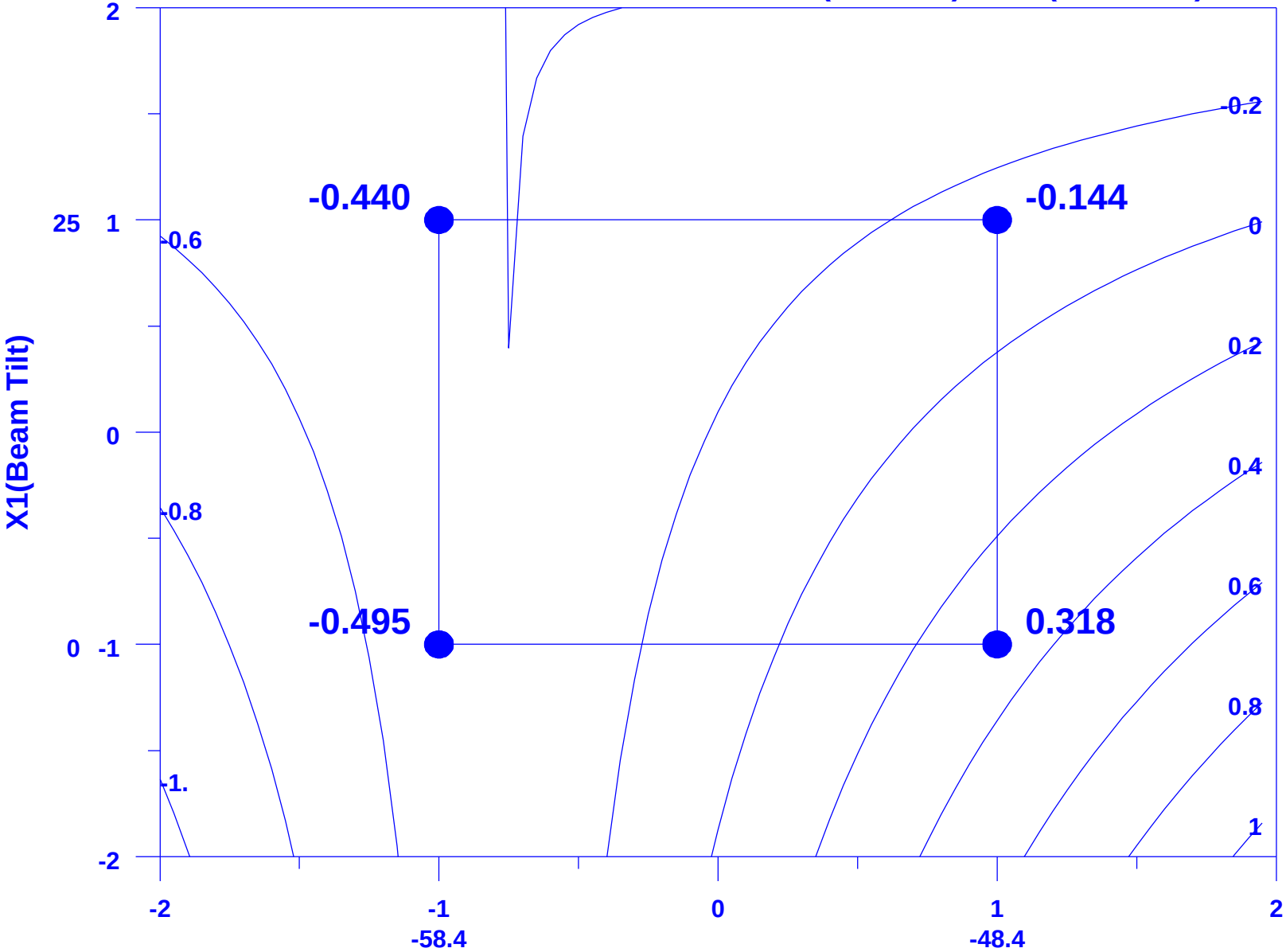
2:

18: 24+35+67

17: 23+45+68

HRTEM Factors Affecting Thickness Measurements of Ultrathin Amorphous SiO2 Layer in CPU/Memory Gate Dielectrics (Nanotechnology)

Contour Plot of 2 Dominant Factors: X5 (Defocus) & X1 (Beam Tilt)



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X6: Astig. Mag.
- : 0
+ : .08

X7: Astig. Azimuth
- : 0
+ : 25

X8: Vibration Amp.
- : 0
+ : .04

Center-Point Predicted Value (From 2-Factor Edge-based Model) = -0.1902