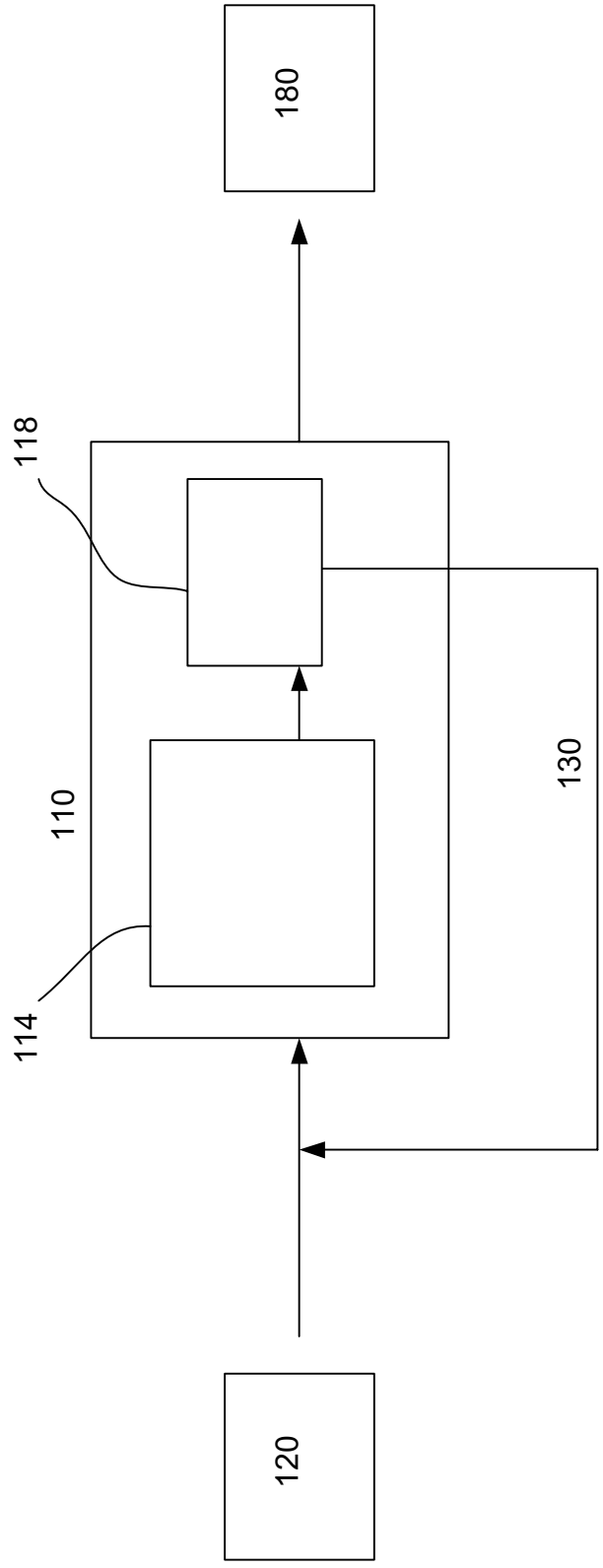


Fig. 1

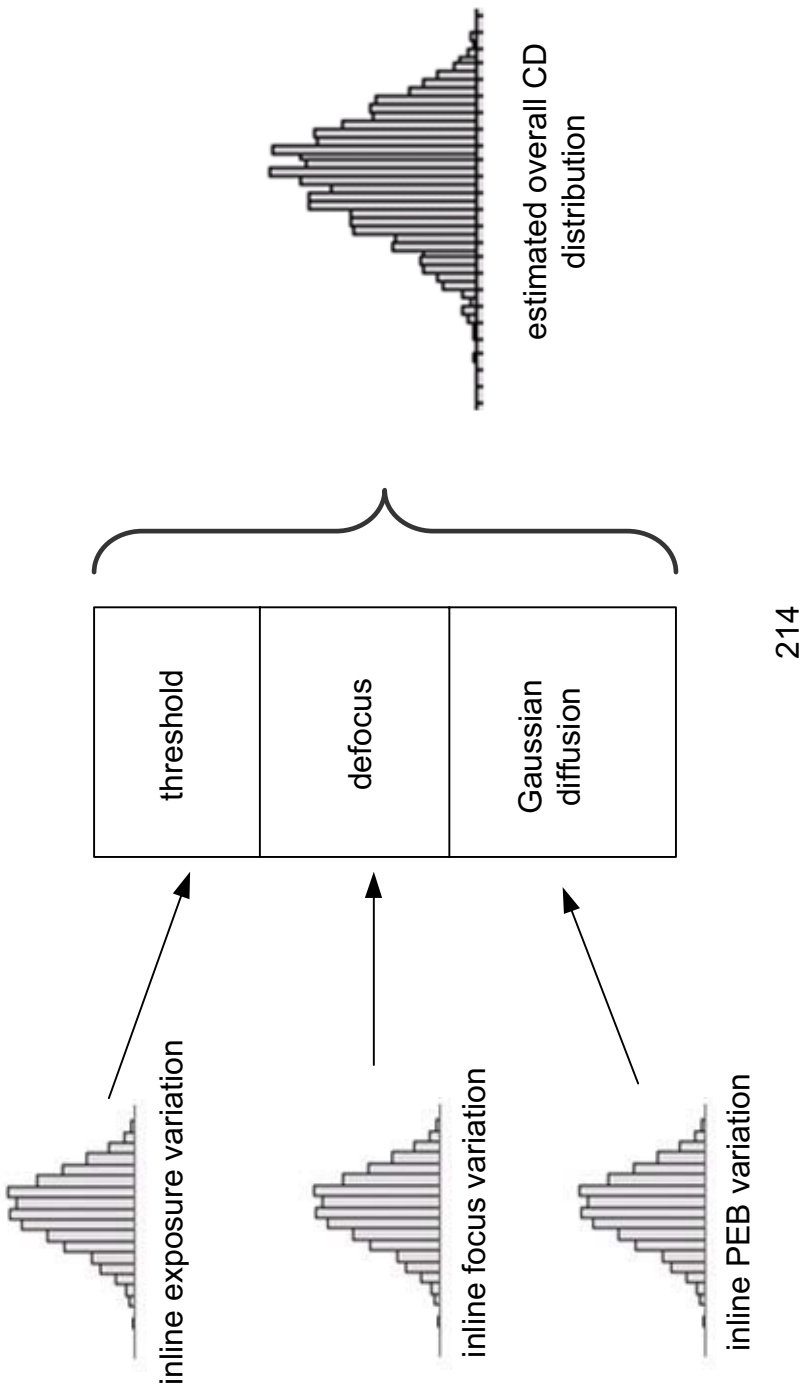

estimated overall CD distribution
threshold
defocus
Gaussian diffusion
214
inline exposure variation
inline focus variation
inline PEB variation

Fig. 2

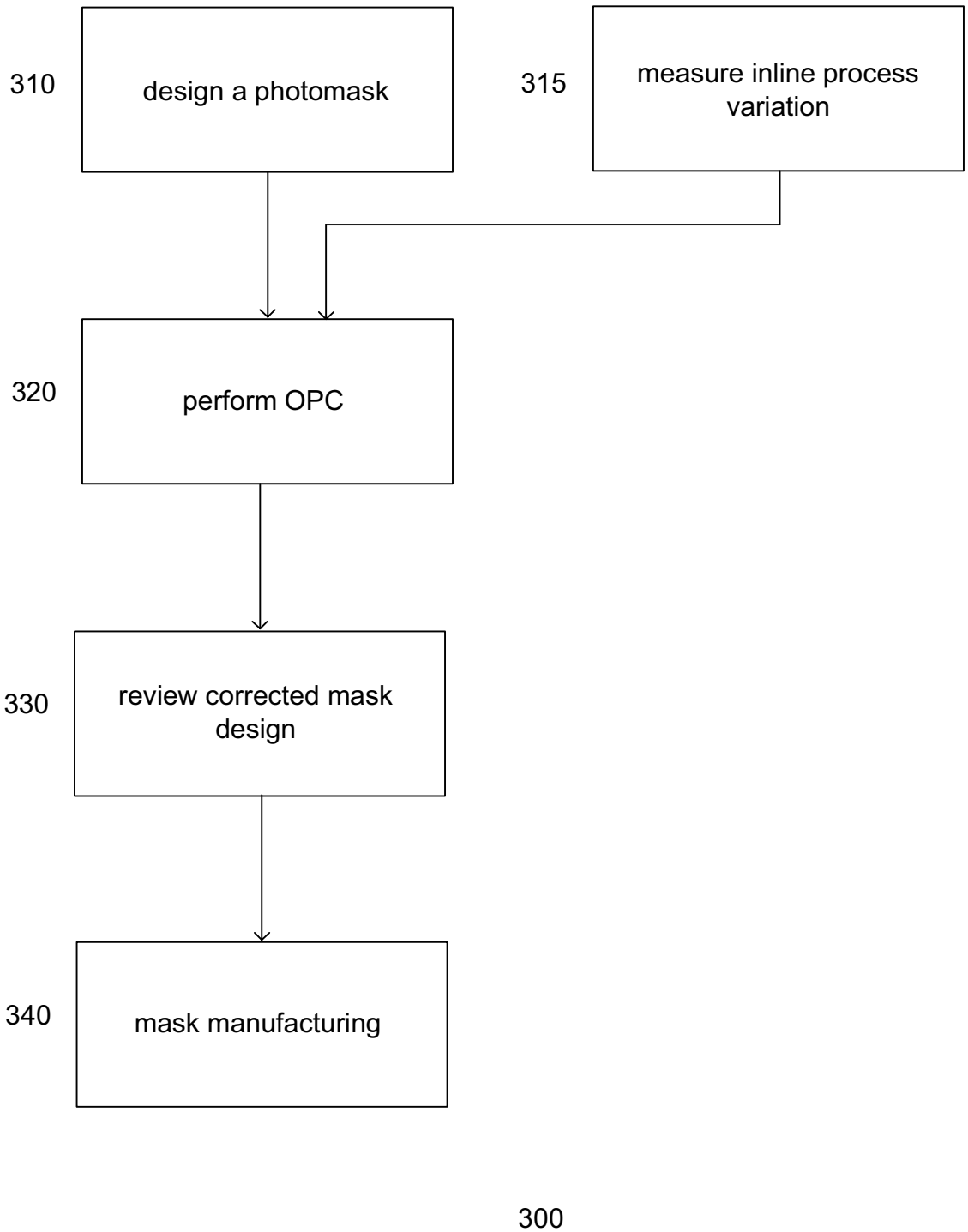

310
design a photomask
315
measure inline process variation
320
perform OPC
330
review corrected mask design
340
mask manufacturing
300

Fig. 3

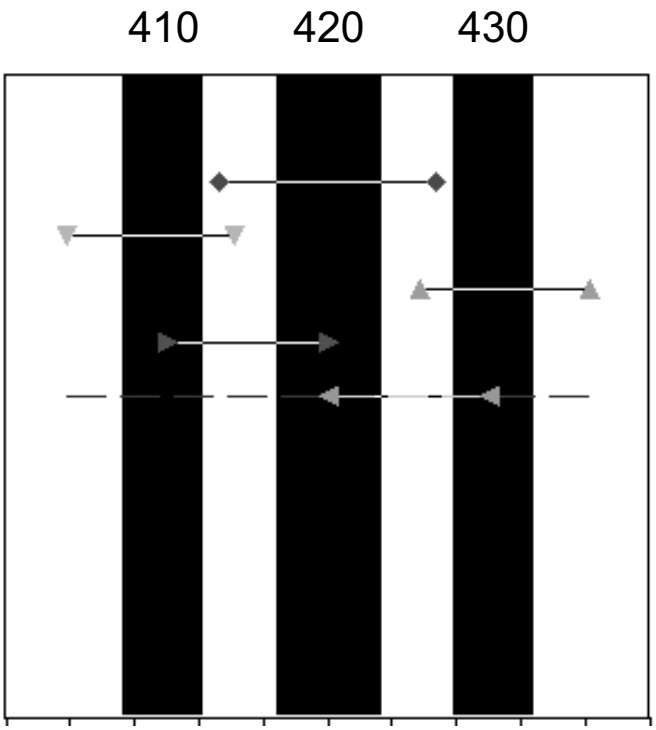

410
420
430

Fig. 4a

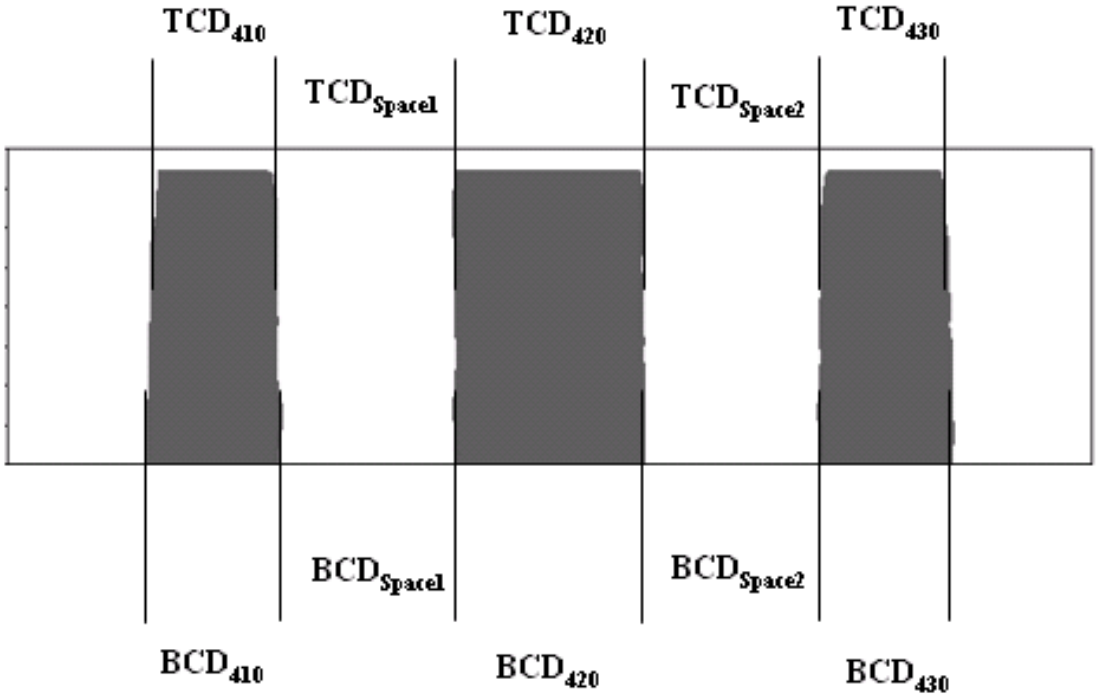

TCD410
TCD420
TCD430
TCDSpace1
TCDSpace2
BCDSpace1
BCDSpace2
BCD410
BCD420
BCD430

Fig. 4b

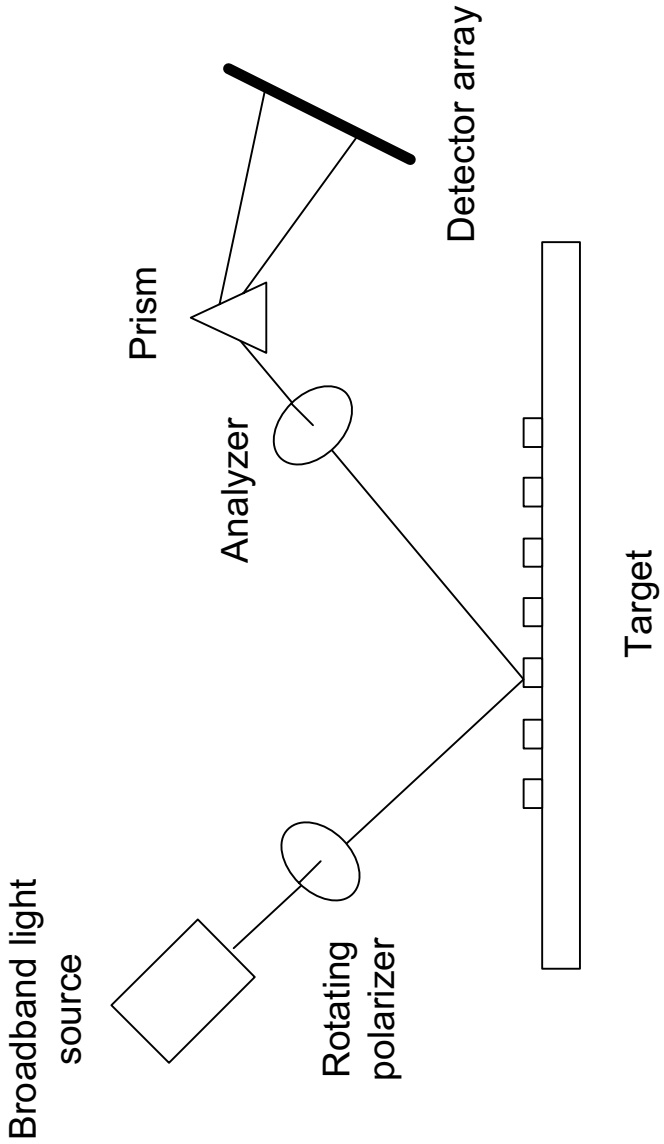

Broadband light source
Rotating polarizer
Target
Analyzer
Prism
Detector array

Fig. 5

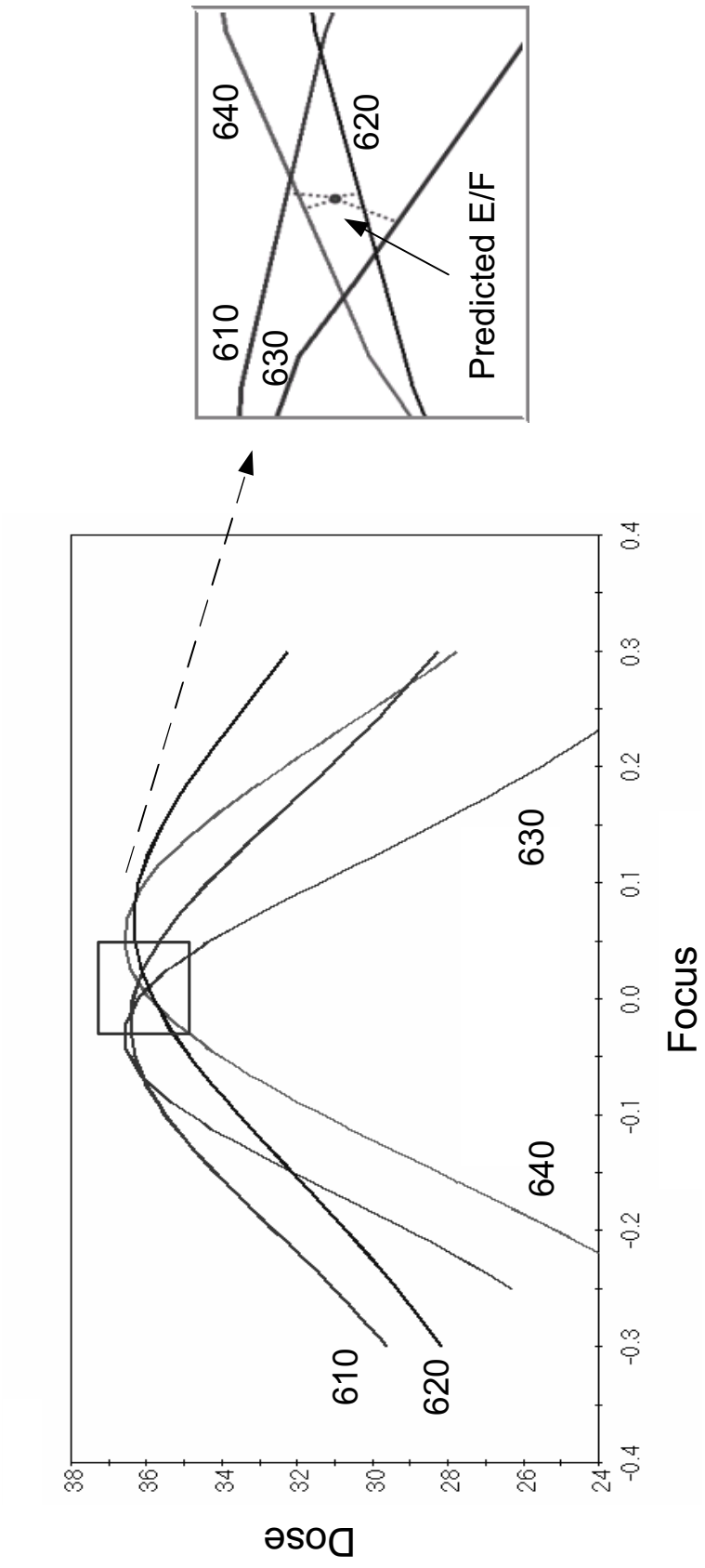

640
620
610
630
Predicted E/F
Dose
Focus
610
620
630
640
38
36
34
32
30
28
26
24
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-0.3
-0.4

Fig. 6a

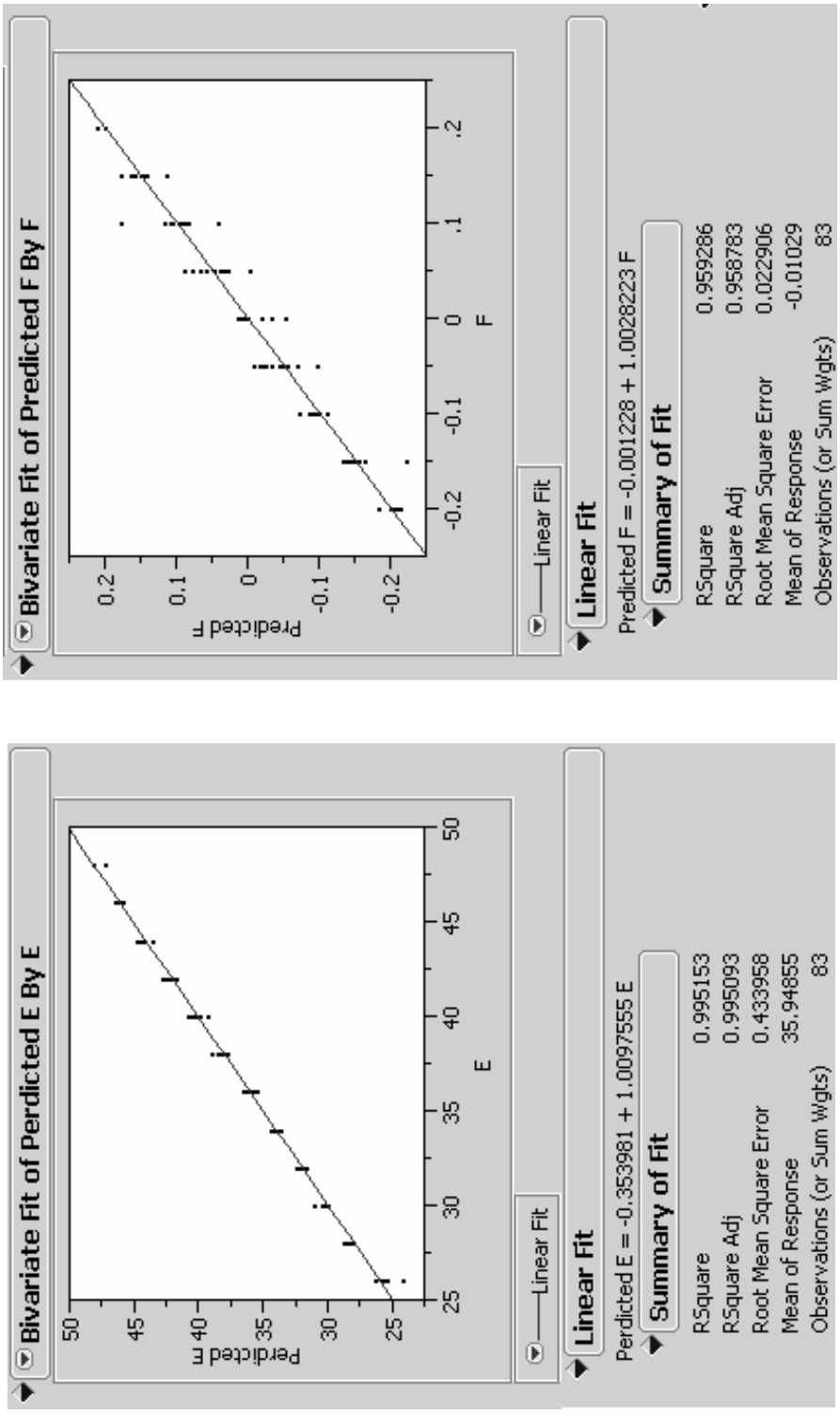
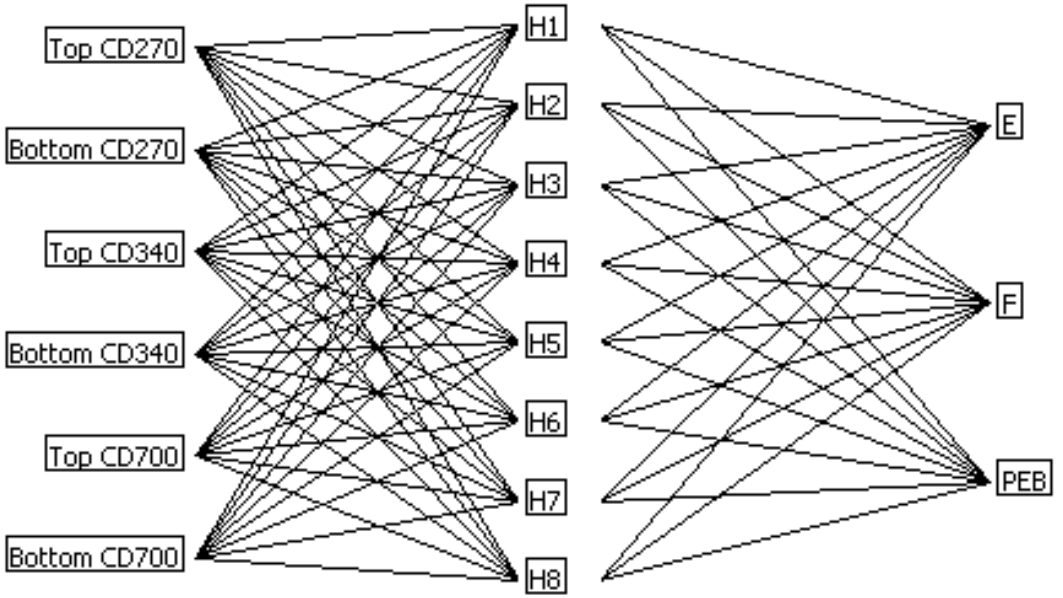

Bivariate Fit of Predicted F By F
Predicted F
F
Linear Fit
Linear Fit
Predicted F = -0.001228 + 1.0028223 F
Summary of Fit
RSquare 0.959286
RSquare Adj 0.958783
Root Mean Square Error 0.022906
Mean of Response -0.01029
Observations (or Sum Wgts) 83
Bivariate Fit of Perdicted E By E
Perdicted E
E
Linear Fit
Linear Fit
Perdicted E = -0.353981 + 1.0097555 E
Summary of Fit
RSquare 0.995153
RSquare Adj 0.995093
Root Mean Square Error 0.433958
Mean of Response 35.94855
Observations (or Sum Wgts) 83

Fig. 6b

Experimental data



Model Calculated Value

$$H_j = S_H\left(c_j + \sum_{i=1}^{N_X} (a_{ij} X_i)\right)$$

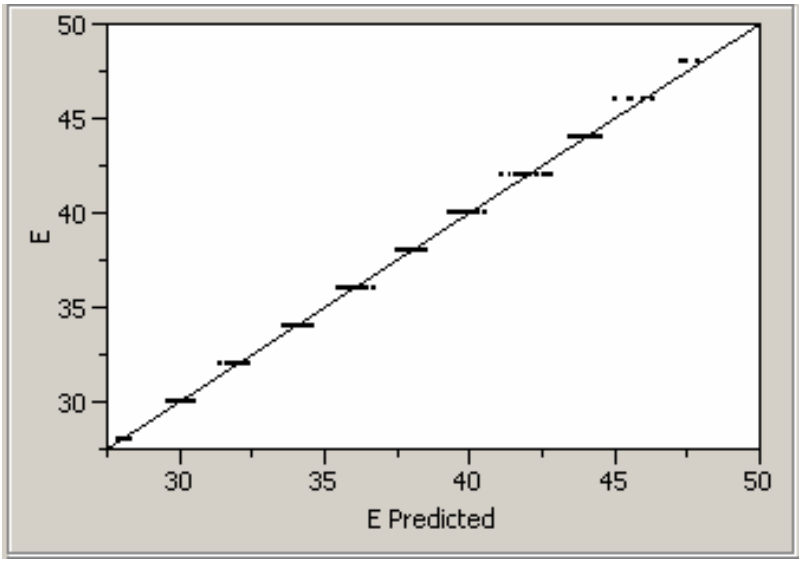
where

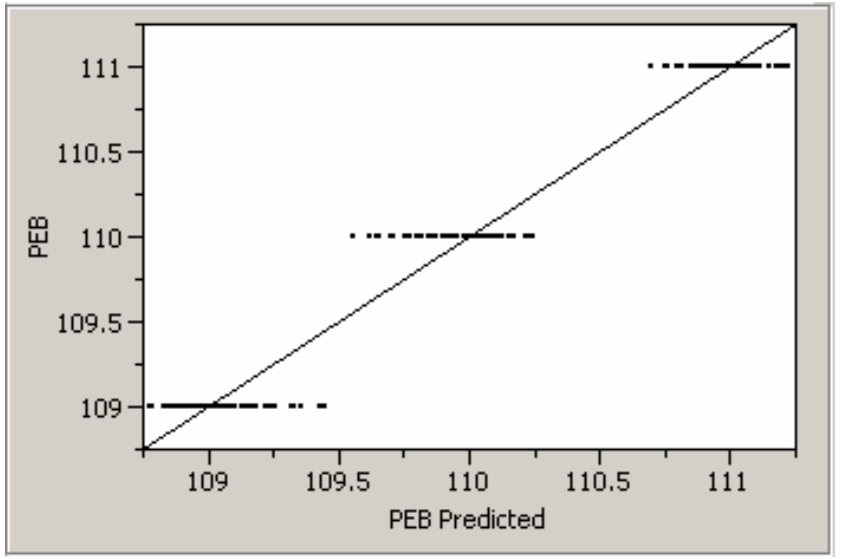
N_X is the number of X variables

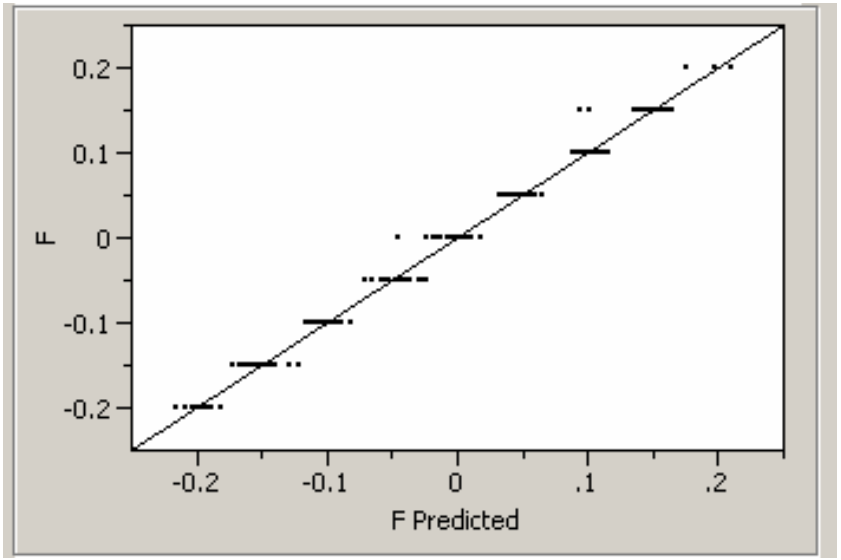
$S_H(x)$ is the logistic function

$$S(x) = \frac{1}{1 + e^{-x}}.$$

Fig. 7a







Y	SSE	SSE Scaled	RMSE	RSquare
E	20.409701459	0.8260781795	0.033434	0.9956
F	0.0268640874	2.1854903208	0.05438163	0.9884
PEB	4.2195138632	5.920850114	0.08950964	0.9685

Fig. 7b

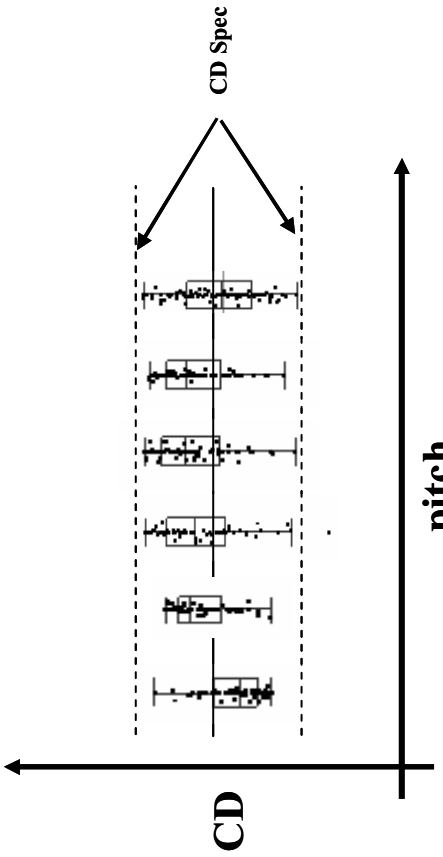


Fig. 8b

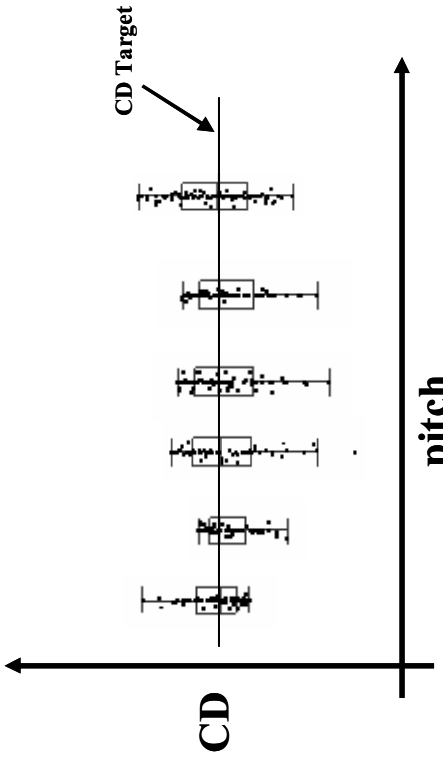


Fig. 8a