XMM-Newton CCF Release Note

XMM-CCF-REL-45

RGS Cross-Dispersion PSF

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December 13, 2000

1 CCF components

Name of CCF	VALDATE	List of Blocks changed	CAL VERSION	XSCS flag
RGS1_CROSSPSF_0002	200-01-01T00:00:00	CROSSPSF	xmmsas_20001207_0215	NO
RGS2_CROSSPSF_0002	200-01-01T00:00:00	CROSSPSF	xmmsas_20001207_0215	NO

2 Changes

The cross-dispersion LSF distribution as a function of dispersion angle β was measured from data taken with Mkn 421 (revolution 84, exposures 0099280101001 & 0099280101002).

Now there is also one distribution available per RGS.

3 Scientific Impact of this Update

The distribution is used for the selection regions in the image domain. The selection region impacts on the effective area of RGS. These new distributions give wider selections that better suit the data.

First data were selected by the order separations filter for first order. It was verified that addition of second order data does not imporve the statistical quality significantly. The dispersed image was divided into 20 band in β and the distributions in cross-dispersion were obtained per band. The intensity of the source is so high that residual background can be neglected.

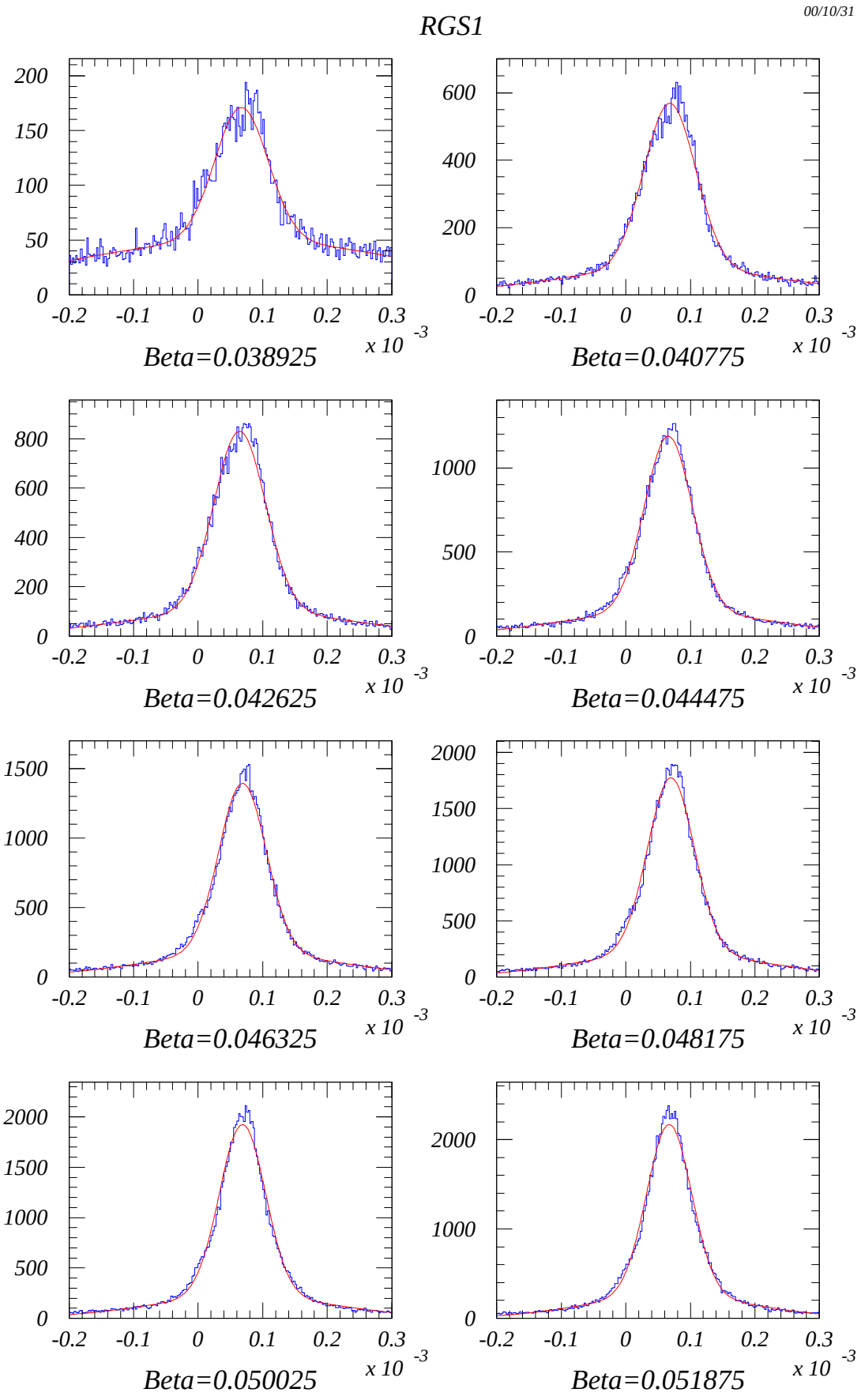
It was verified that the second order data are statistically consistent with these distributions.

These each of these distributions in cross-dispersion was fit with two added Gaussians. The result of these fits is plotted in the attached figures (red is the result of the fit, blue is the data). As can be seen, the distributions can very well be parameterized with two Gaussians with common center. Only at the very center of the largest BETA of RGS2 the two Gaussian approach fails, but the integral error (which effects the effective area only) that is made by this is small.

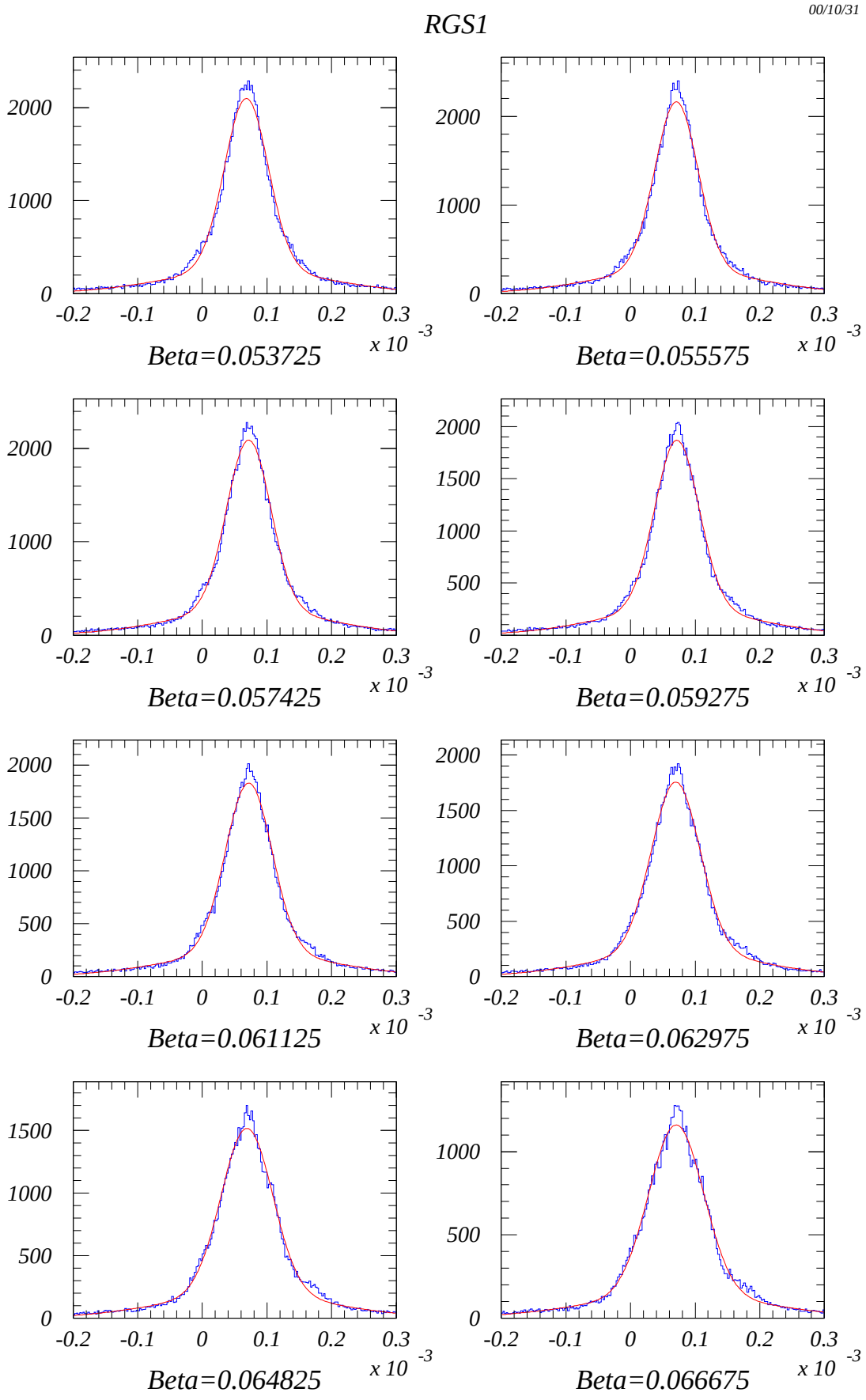
4 Estimated Scientific Quality

Decrease of the uncertainty of this contribution to the the effective area for narrow selection regions is estimated to be reduced to a few percent. For large selection regions ($> 97\%$) the change would be small. For large regions, however care must be taken, as more background is included in the selected data.

00/10/31 10.42


RGS1
Beta=0.038925
Beta=0.040775
Beta=0.042625
Beta=0.044475
Beta=0.046325
Beta=0.048175
Beta=0.050025
Beta=0.051875
x 10 -3

00/10/31 10.43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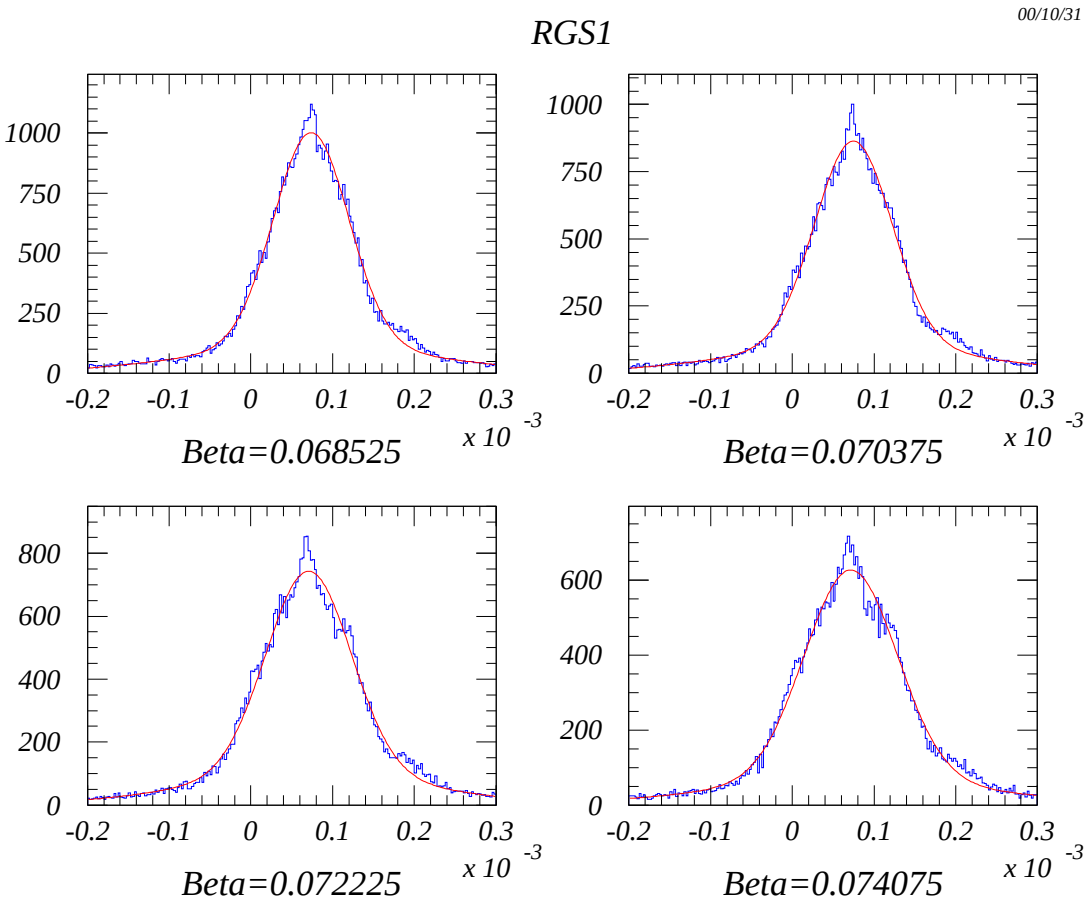
Beta=0.053725
Beta=0.055575
Beta=0.057425
Beta=0.059275
Beta=0.061125
Beta=0.062975
Beta=0.064825
Beta=0.066675
x 10 -3


00/10/31 10.44
RGS1
1000
750
500
250
0
-0.2 -0.1 0 0.1 0.2 0.3
x 10 -3
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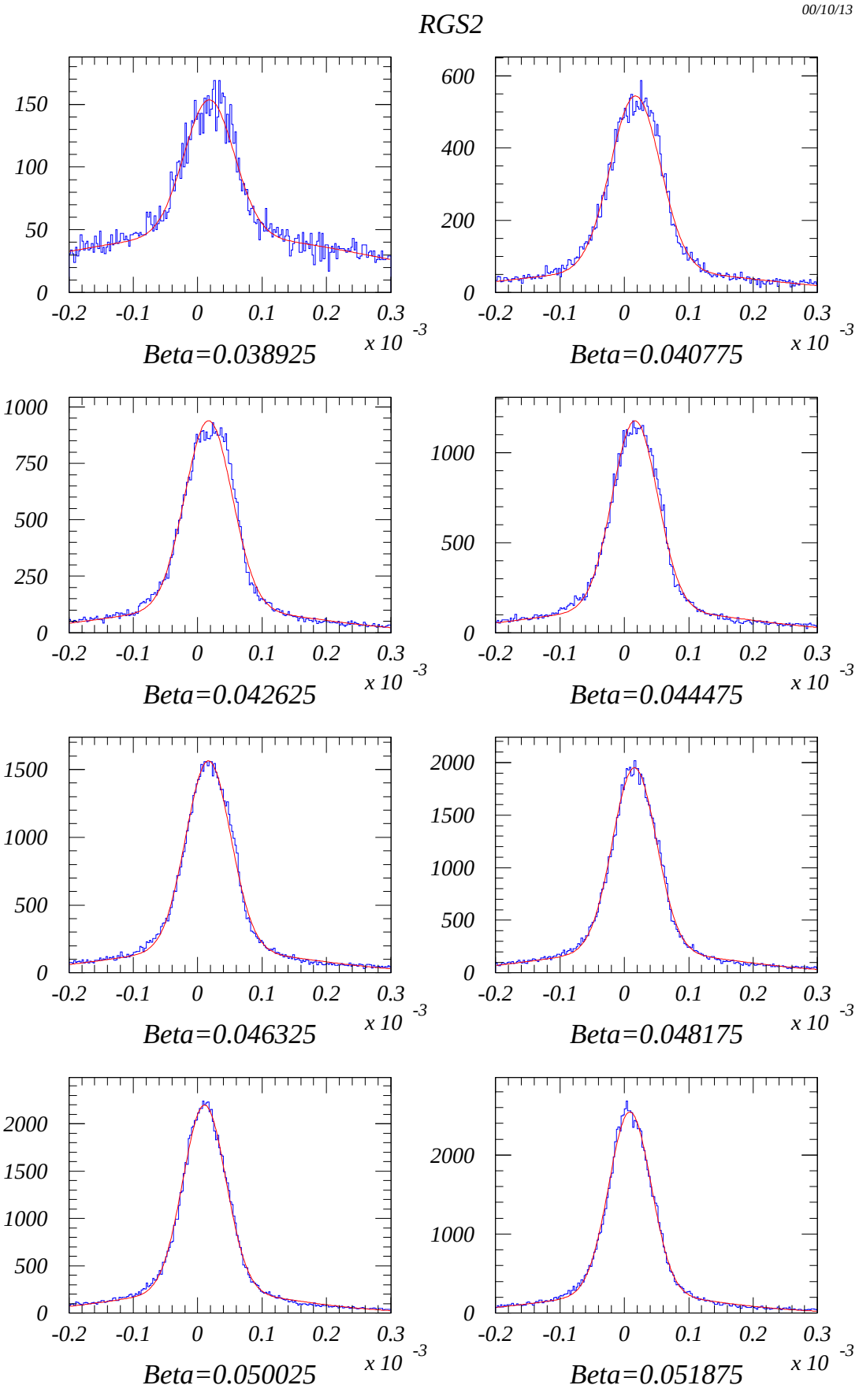
Beta=0.070375
800
600
400
200
Beta=0.072225
Beta=0.074075

00/10/13 14.15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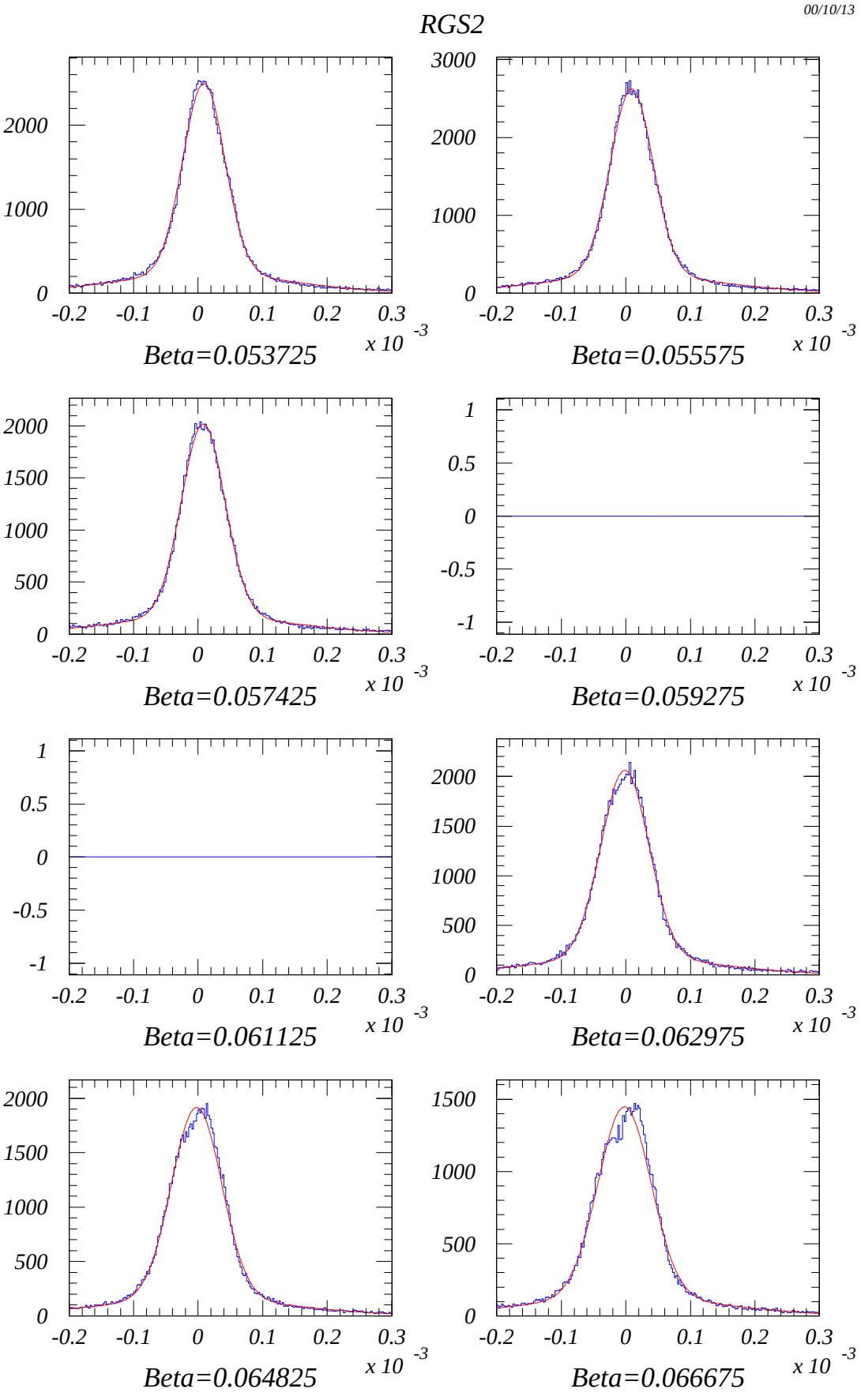
Beta=0.046325
Beta=0.048175
Beta=0.050025
Beta=0.051875
x 10 -3

00/10/13 14.15


RGS2
Beta=0.053725
Beta=0.055575
Beta=0.057425
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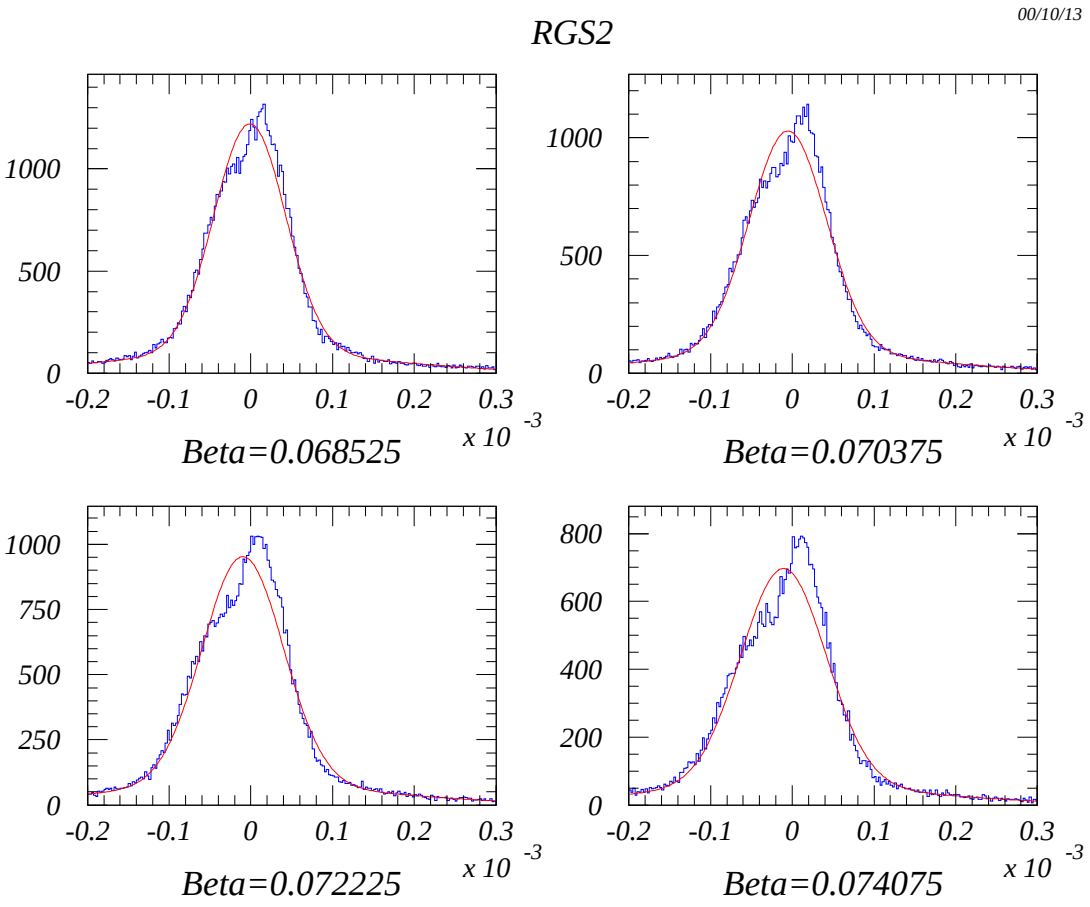
Beta=0.061125
Beta=0.062975
Beta=0.064825
Beta=0.066675
x 10 -3


00/10/13 14.15
RGS2
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500
0
-0.2 -0.1 0 0.1 0.2 0.3
x 10 -3
Beta=0.068525
1000
500
0
-0.2 -0.1 0 0.1 0.2 0.3
x 10 -3
Beta=0.070375
1000
750
500
250
0
-0.2 -0.1 0 0.1 0.2 0.3
x 10 -3
Beta=0.072225
800
600
400
200
0
-0.2 -0.1 0 0.1 0.2 0.3
x 10 -3
Beta=0.074075