Some results from trying to get rid of some systematic misalignments

Contents

Overview of objects

Object	Description	chi^2 from pede
mp0221	Result from 1st Iteration of alignment with Cosmics and MinBias (courtesy Jula)	1.182323
mp0221zexp	A z-expanded version of the same geometry, expanding z by 1mm/m	N/A
mp0265	Result after aligning with Cosmics and MinBias	1.188989
mp0266	Another iteration on top of mp0265	1.188797

All plots show the geometry comparison with common tracker. The alignment used regularisation but no presigma (i.e. the default presigma was applied by pede internally). Aligned were the structures on the highest and lowest level of each subdetector. The dataset were MinBias from collisions and Cosmics from 2010.

Sidenote: eps files converted to png using `convert -density 160 file.eps file.png`

Subdet comparison available at mp0265_vs_mp0221.Comparison_commonSubDets mp0265_vs_mp0221.Comparison_commonTracker

Plots

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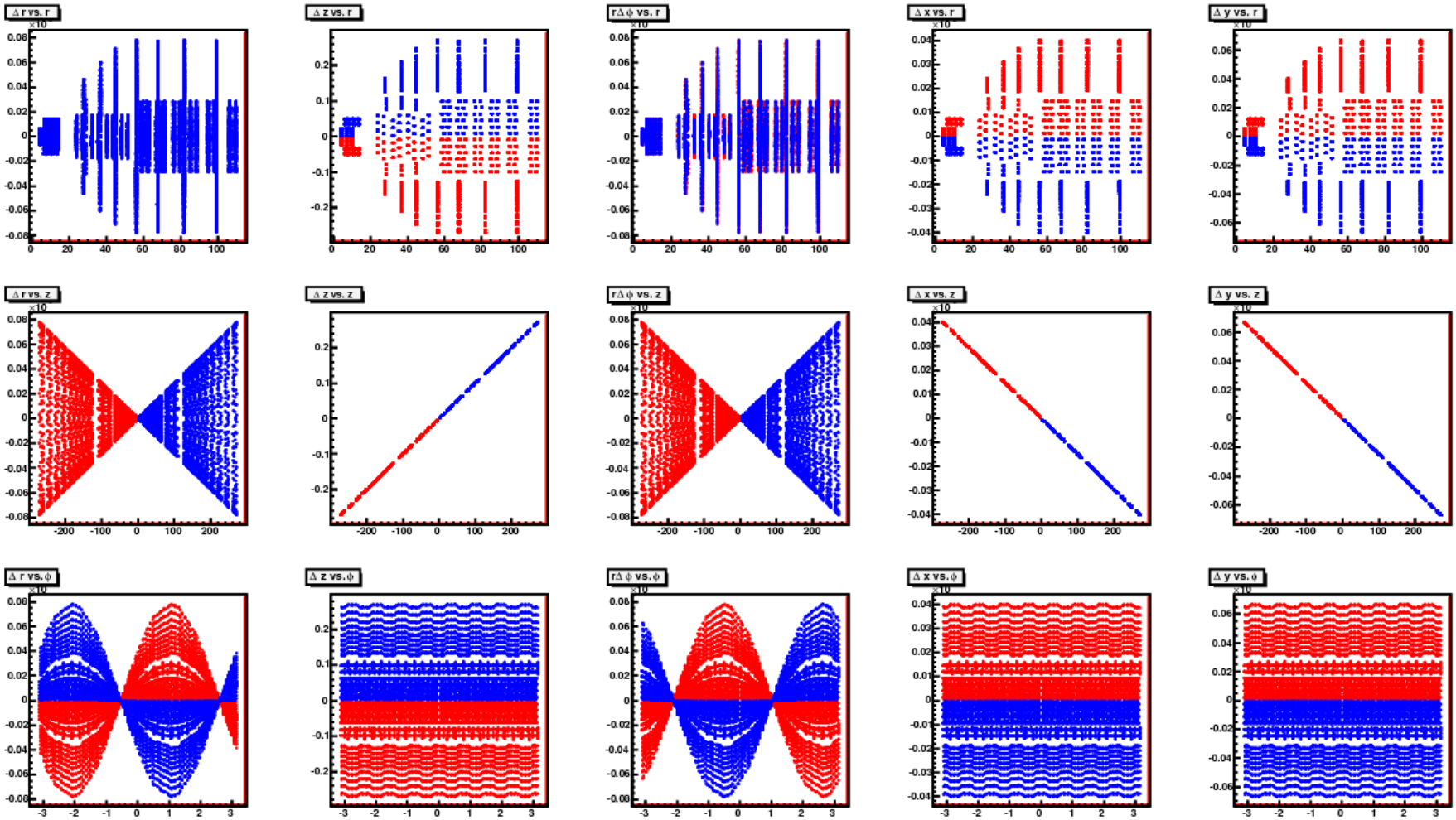
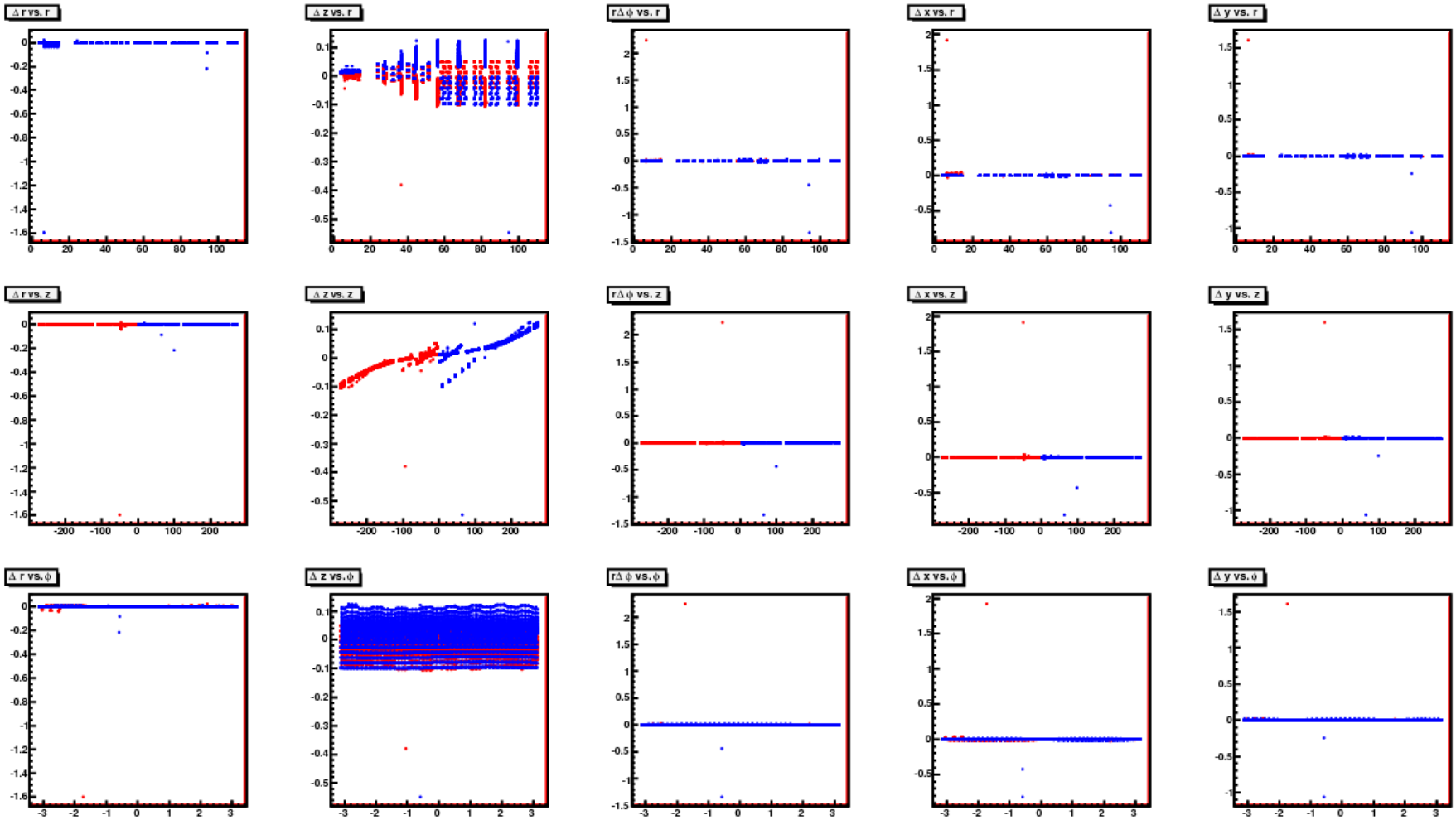
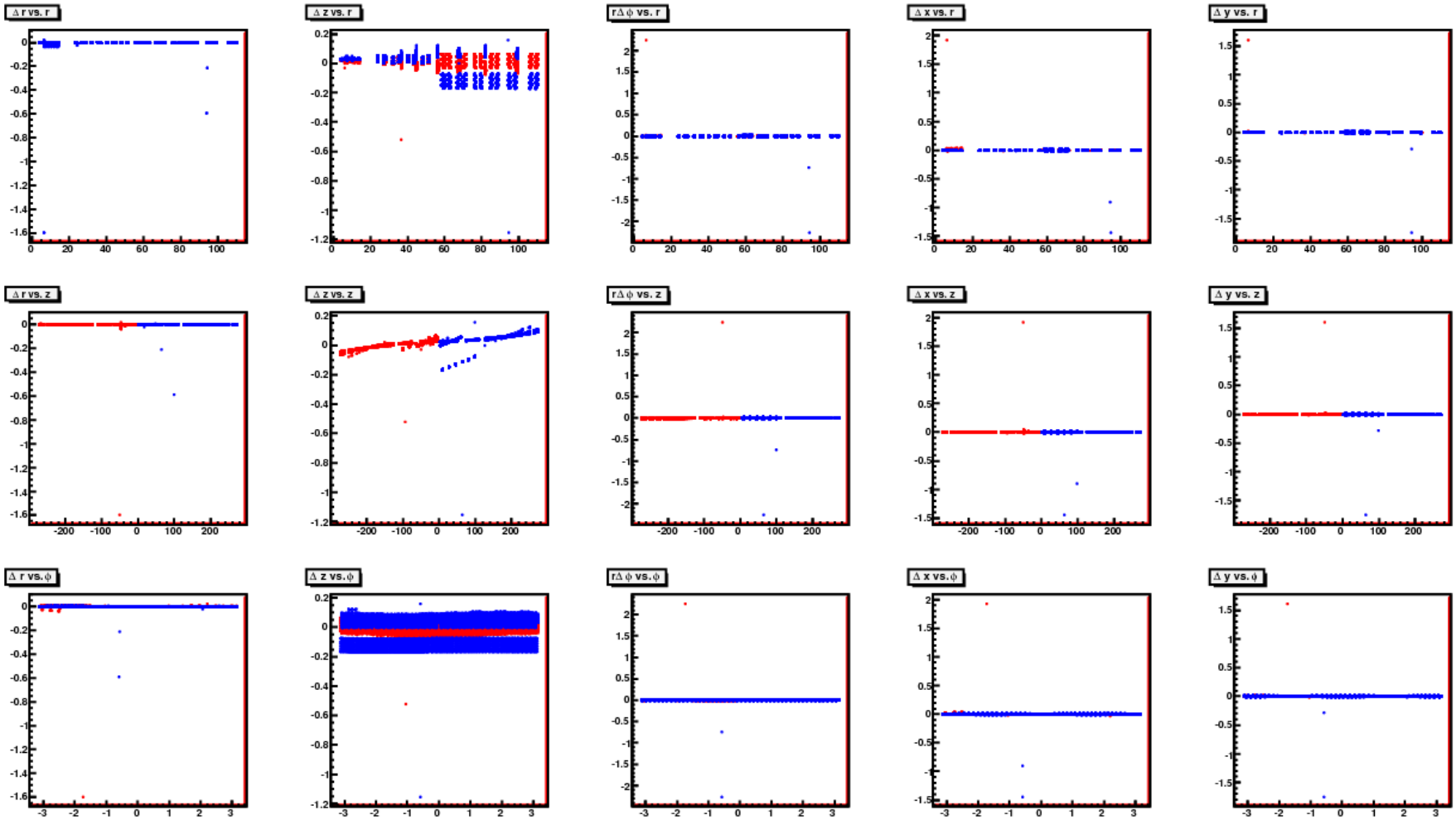
mp0221zexp_vs_mp0221:
this shows the nacked z-expansion



mp0265_vs_mp0221:
the alignment recovers almost half of the z-expansion - quite impressive (except for the outliers)



mp0266_vs_mp0221:
there is some improvement, but the group of outliers biases it.



Conclusion

The algorithm seems to be capable to recover from a z-expansion. The remaining outliers (two showing large movements, others stay in a group off the initial position) seem to distort the chi^2. Therefore it is not a weak mode (it is chi^2 sensitive) but we cannot recover. Watching the CommonTracker plots for the subdets suggests that the TIB has problems in recovering. A reasonable explanation is the following: Some rods in the TIB had their HV off during the time the MinBias dataset has been taken. This would constrain the TIB to move in a correlated manner. This is exactly what we observe (see the detaillied comparison plots).

Keep in mind that this alignment has been done using real data. The remaining poorly aligned modules may be due to limited statistics or other problems which were not investigated at the moment. A study with MC data will need a proper Cosmic dataset, which is still not available.

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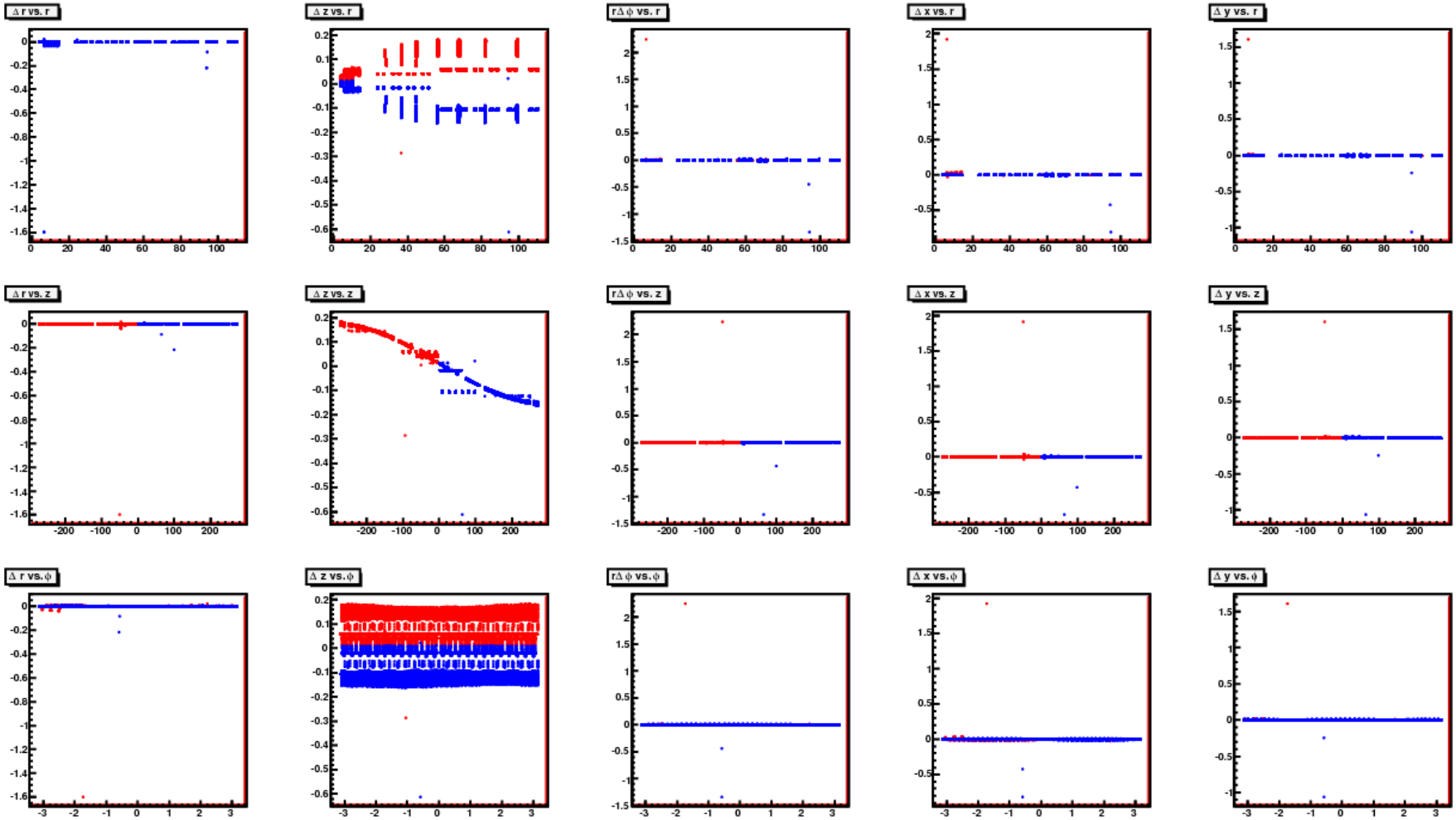
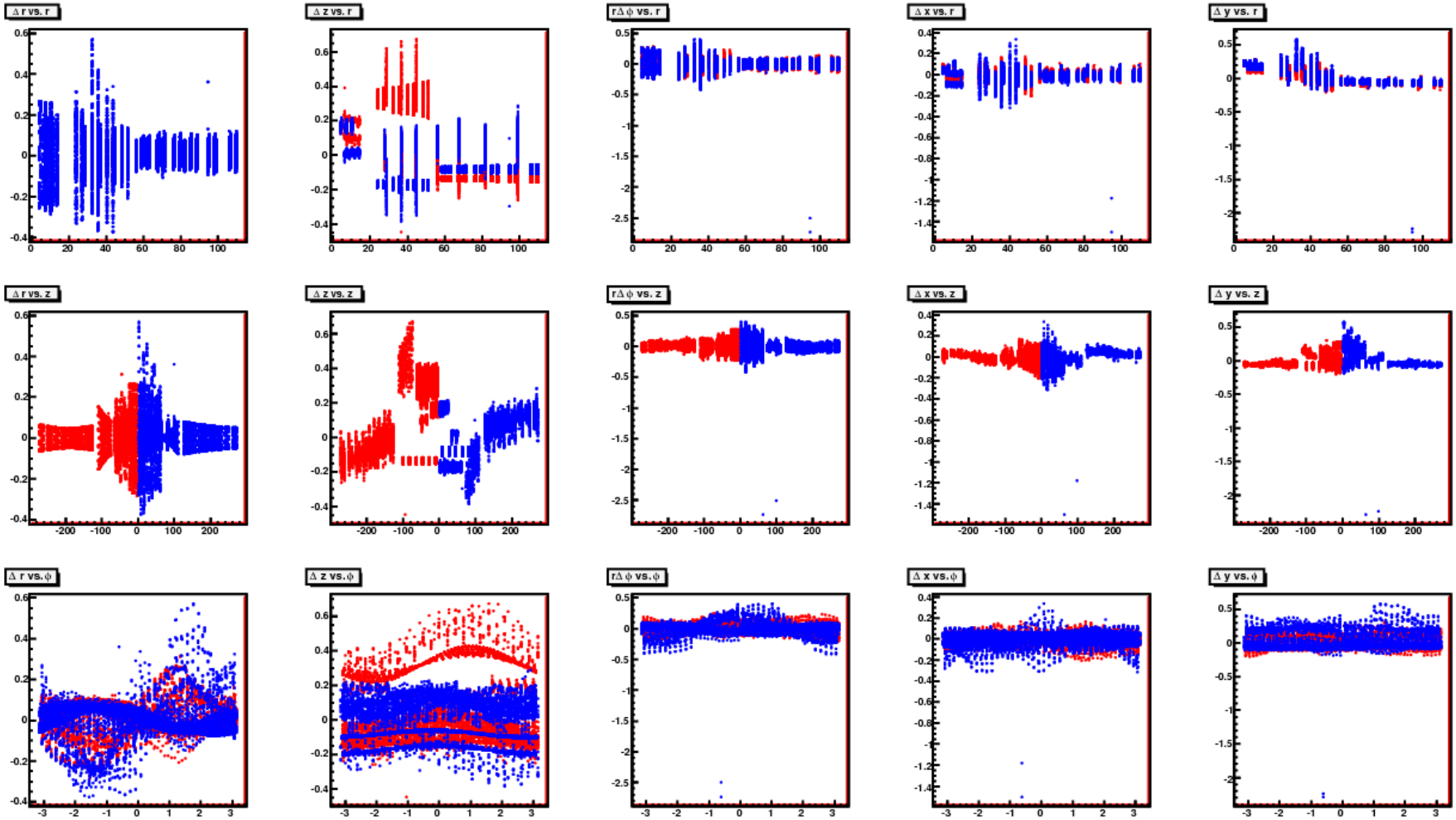
mp0265_vs_mp0221zexp:
the inverse plot to see what the alignment did from its starting point

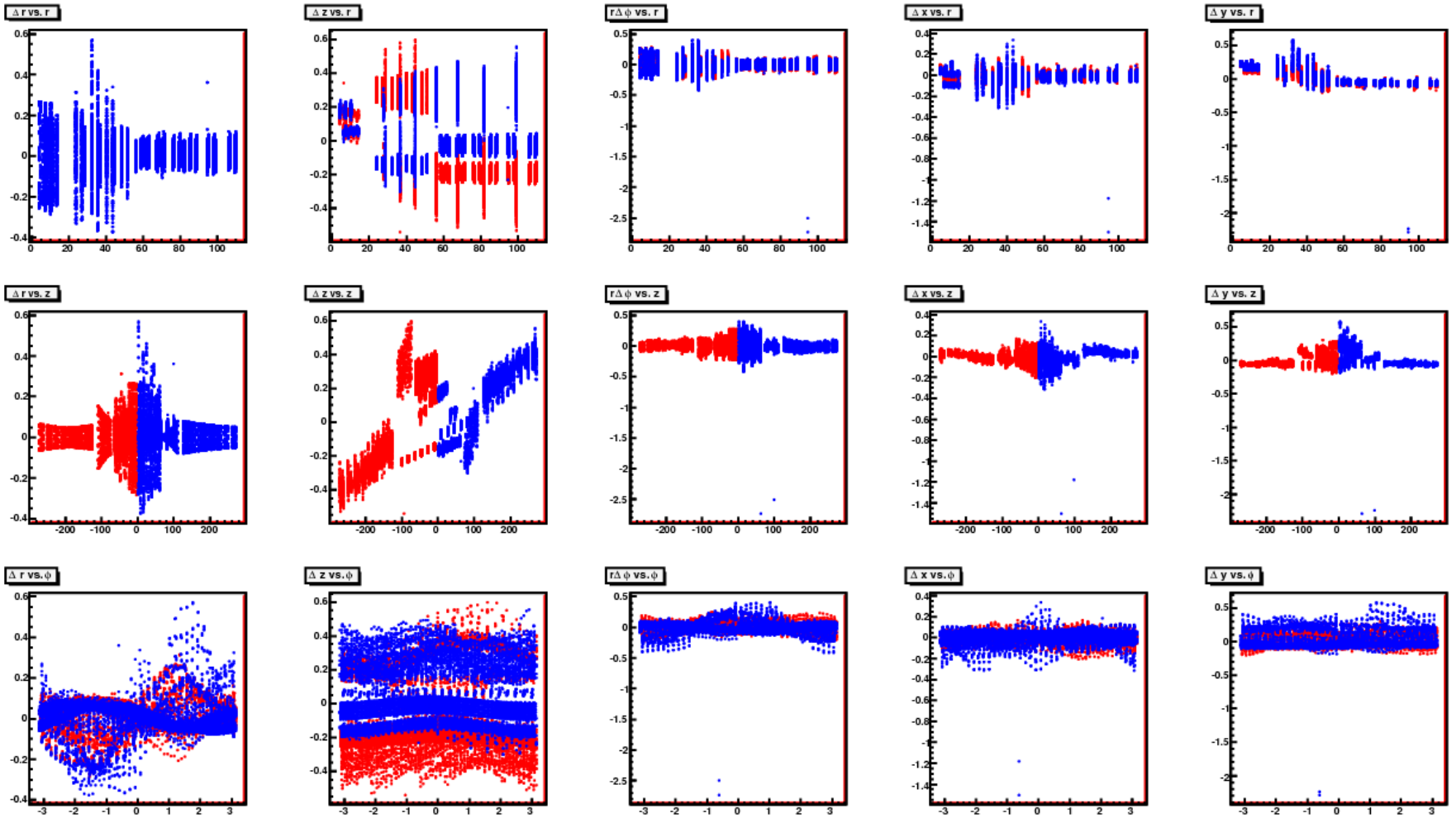


Comparisons vs. IDEAL to get the overall impression

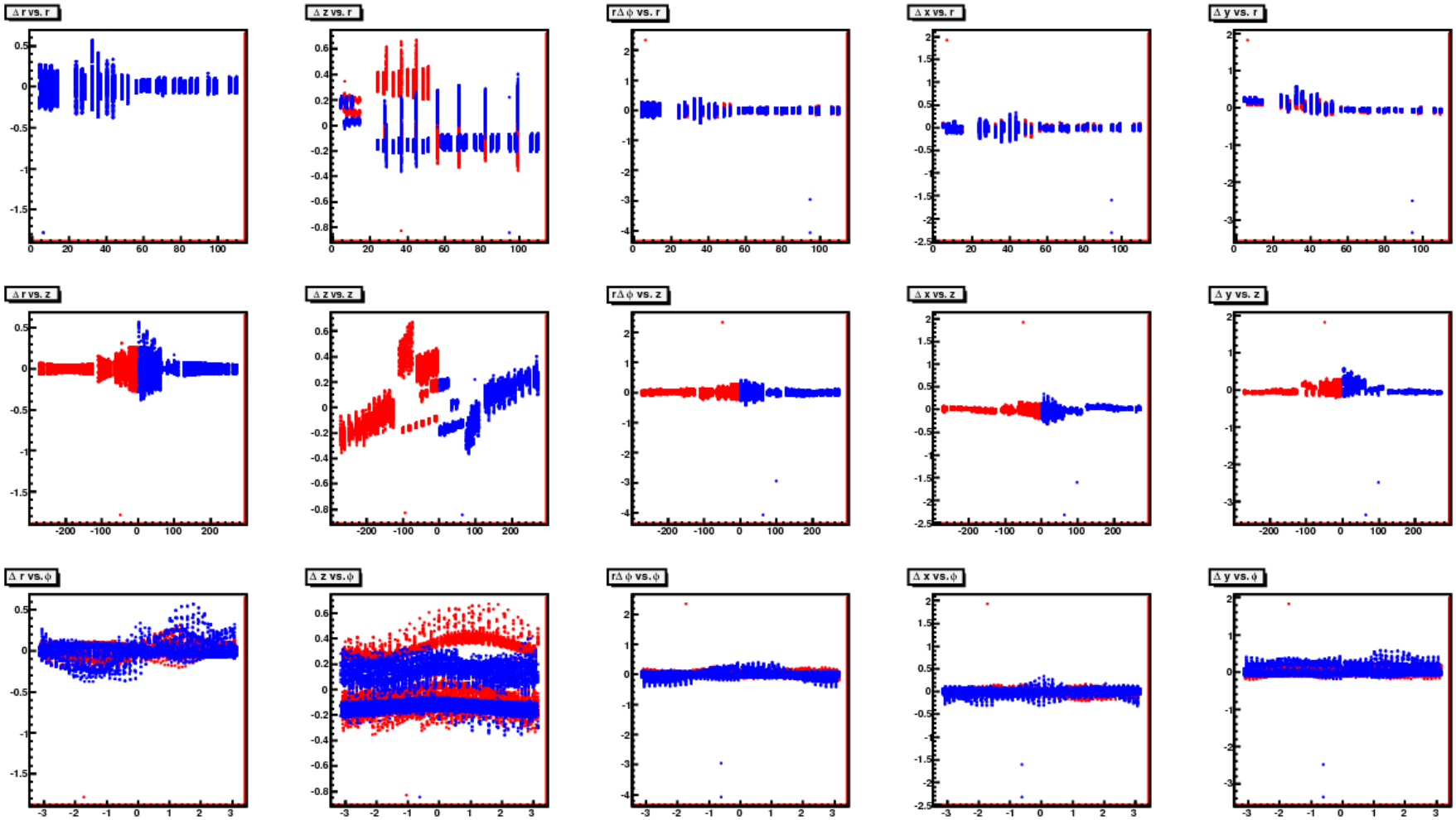
mp0221_vs_IDEAL:



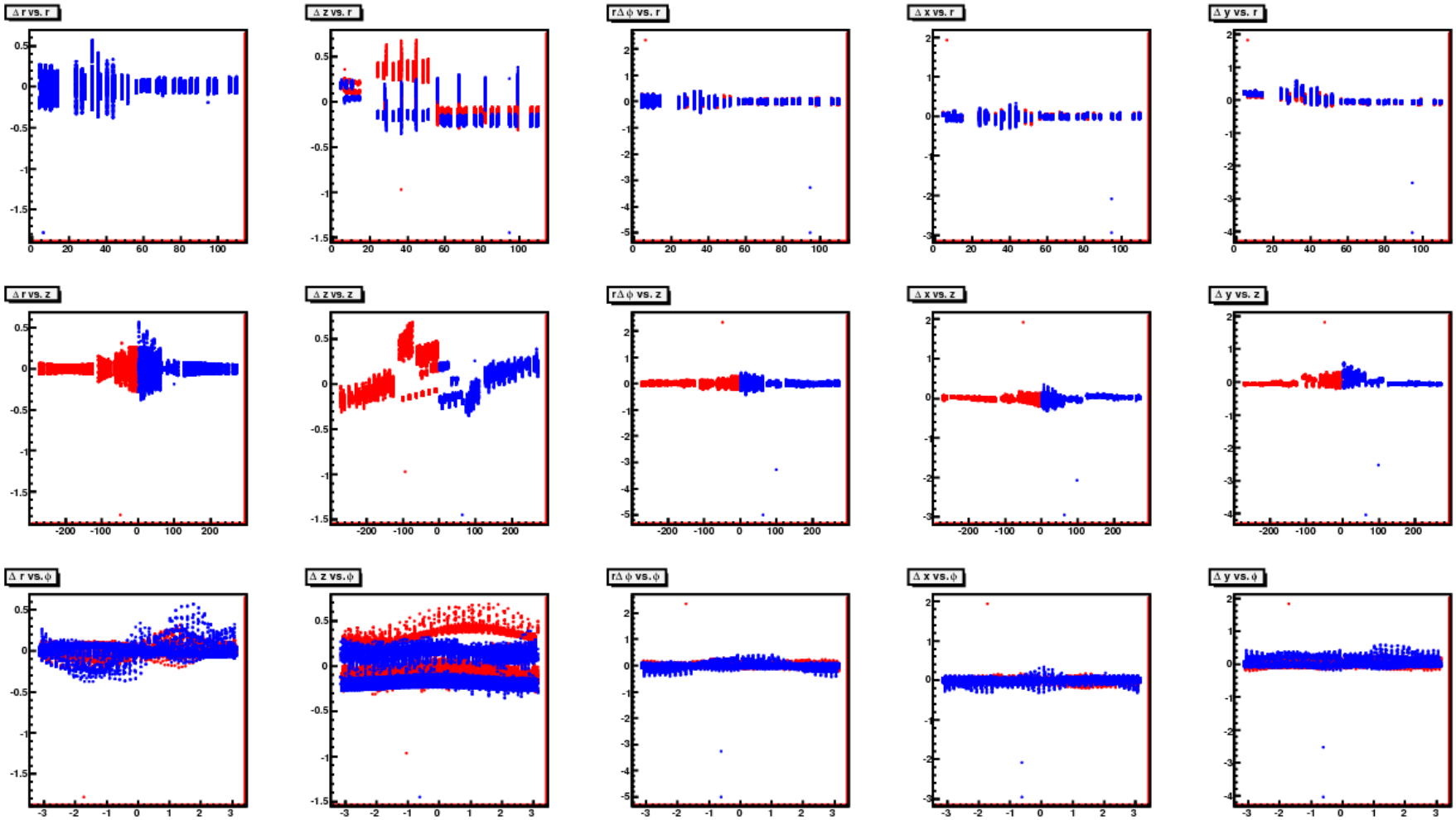
mp0221zexp_vs_IDEAL



mp0265_vs_IDEAL



mp0266_vs_IDEAL



Made with ViM version 7.0.237

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