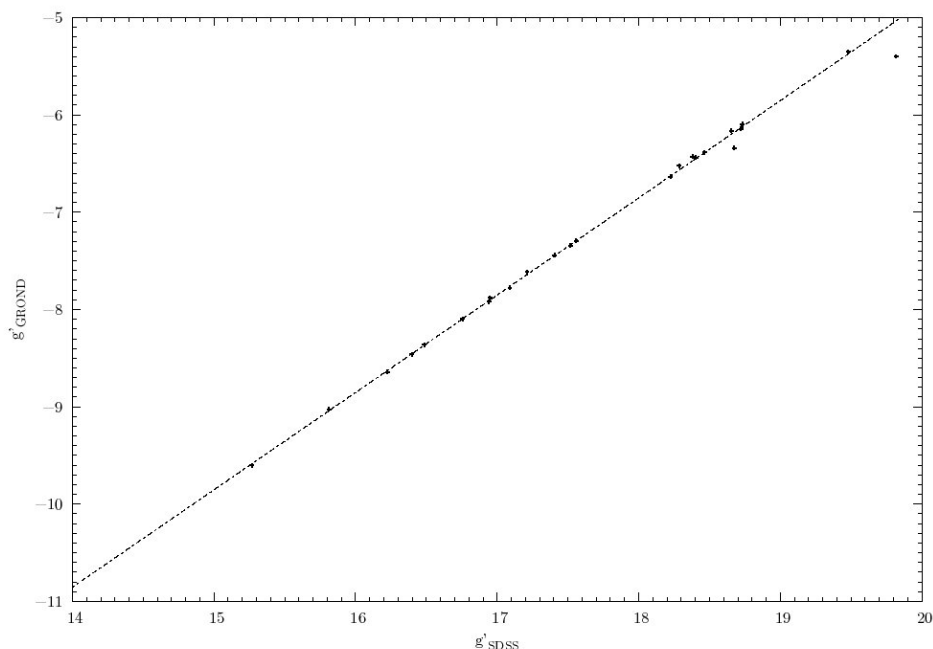


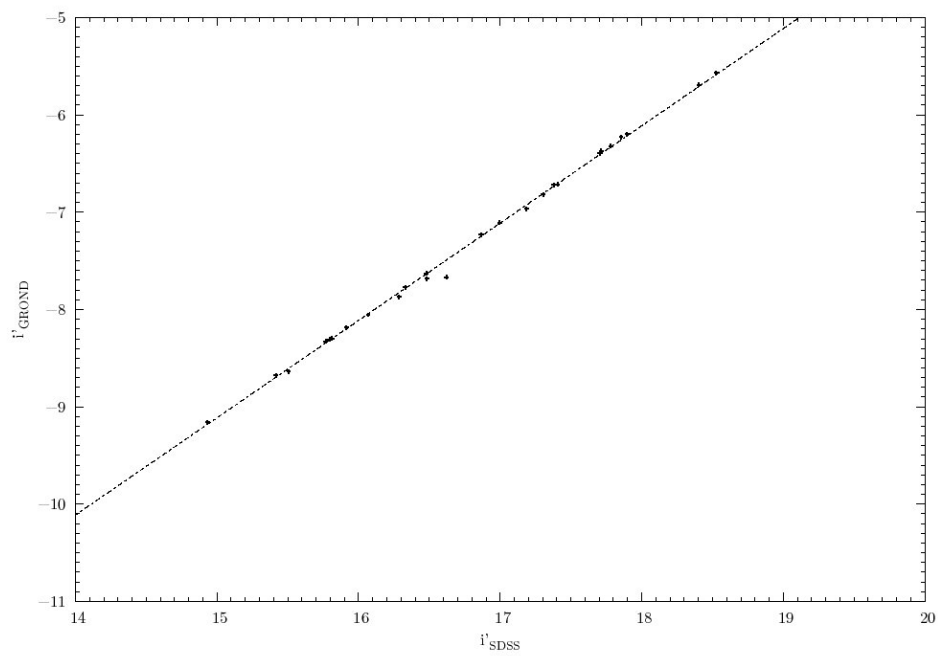
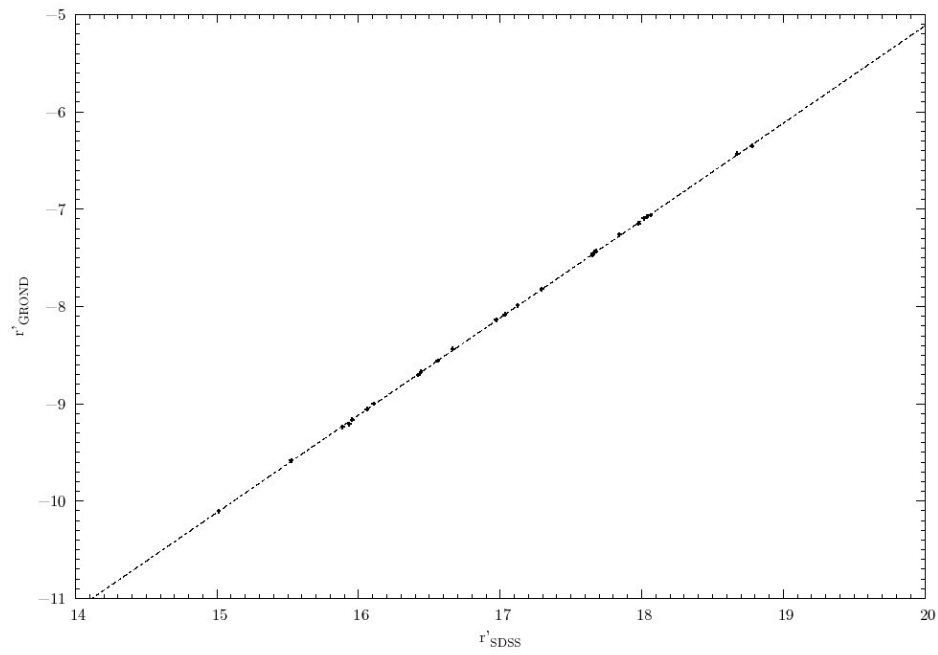
# GROND Photometry

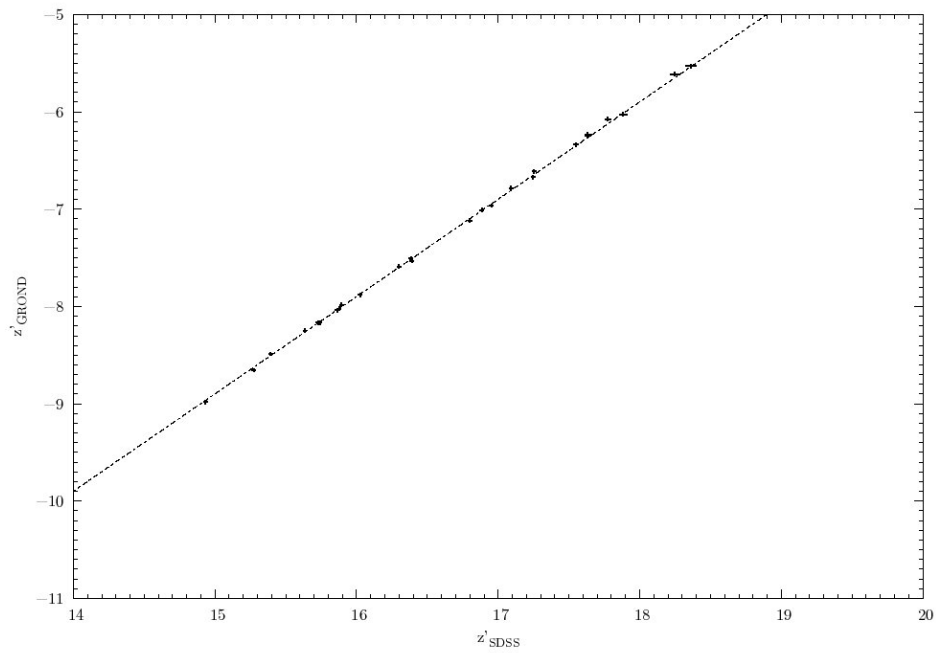
## **g'r'i'z'**

In g'r'i'z' the GROND filter system is based on the SDSS. This is nearly a true AB system (see also here <http://www.sdss.org/dr4/algorithms/fluxcal.html>). The GROND zeropoint is defined as the magnitude which produces 1 e-/s in an area which is equivalent to a circle with diameter of 1 fwhm. Calibration against SDSS provides an absolute photometry with accuracies in the range of 0.02 to 0.04 mag. Shown here is the example of GRB 081028.

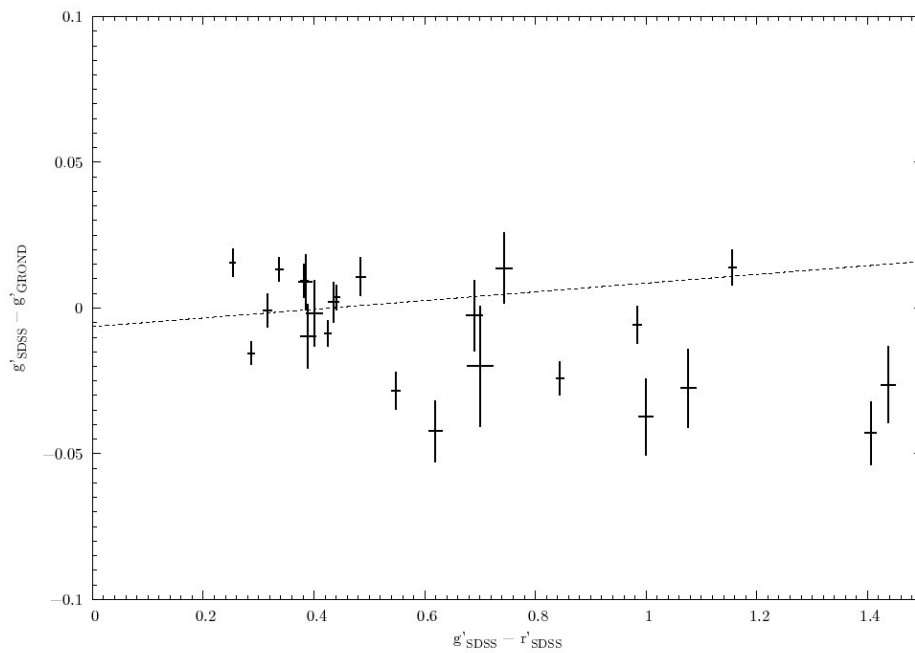
Using larger apertures (e.g., faperture = 2 ... 3) in the photometry for both the standard field and the target field, one can minimize uncertainties in the calibration, caused by errors in FWHM determination.

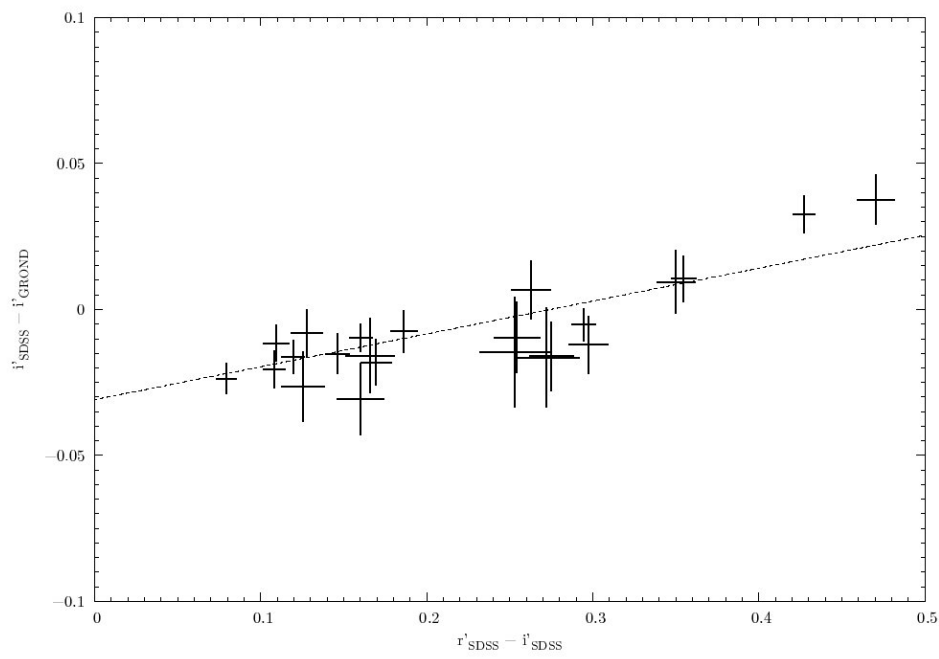
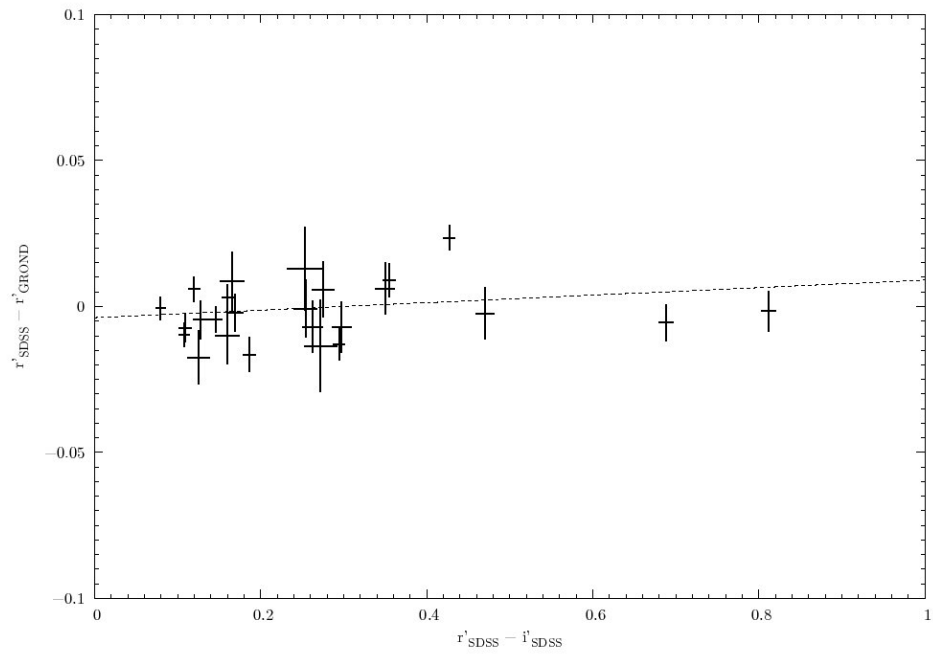


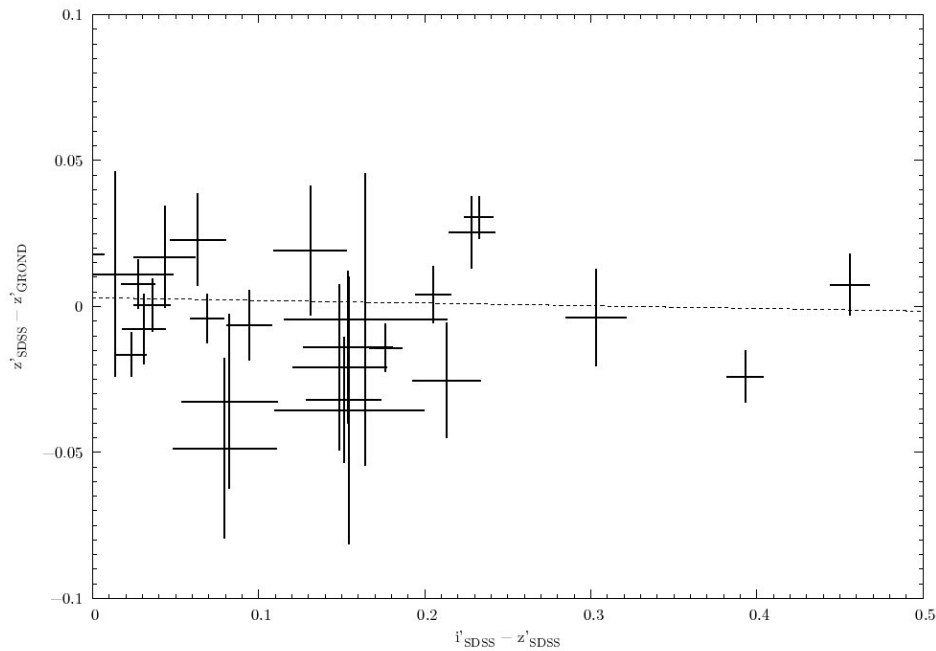




The GROND filters in g'r' and z' are nearly identical to the SDSS g'r'z' filter curves, and the calibrated magnitudes do not show evolution with color and all color terms are zero within 1 sigma. The i' filter in GROND is much narrower than the SDSS i' and there is evidence for a color dependence.







The color terms are:

- $g\_SDSS - g\_GROND = (-0.006 \pm 0.014) + (0.015 \pm 0.025) * (g\_SDSS - r\_SDSS)$
- $r\_SDSS - r\_GROND = (-0.004 \pm 0.004) + (0.012 \pm 0.015) * (r\_SDSS - i\_SDSS)$
- $i\_SDSS - i\_GROND = (-0.031 \pm 0.005) + (0.113 \pm 0.014) * (r\_SDSS - i\_SDSS)$
- $i\_SDSS - i\_GROND = (-0.023 \pm 0.010) + (0.216 \pm 0.054) * (i\_SDSS - z\_SDSS)$
- $z\_SDSS - z\_GROND = (-0.003 \pm 0.005) - (0.009 \pm 0.027) * (i\_SDSS - z\_SDSS)$

Zeropoints for Airmass 1 obtained on 28.10.2008 are:

- $g' = 24.96 \pm 0.02$
- $r' = 25.17 \pm 0.01$
- $i' = 24.11 \pm 0.02$
- $z' = 23.92 \pm 0.02$

Extinction coefficients obtained on the same night are:

- $dg' = 0.152 \pm 0.011$
- $dr' = 0.083 \pm 0.012$
- $di' = 0.034 \pm 0.014$
- $dz' = 0.031 \pm 0.011$

As the GROND photometric system is found to be nearly identical with the SDSS, one can use color transformation between UBVRI and griz as derived e.g. in Jordi, Grebel, & Ammons (A&A, 460, 2006), who used around 800 stars in the Landolt Fields SA 94 and SA 107.

- $g\_GROND = g\_SDSS = -0.124 + 0.630*(B-V) + V$
- $r\_GROND = r\_SDSS = +0.088 + 0.267*(V-R) + R$
- $i\_SDSS = +0.329 + 0.247*(R-I) + I$
- $z\_GROND = z\_SDSS = 0.474 - 1.584*(R-I) + 0.267*(V-R) + R$

With  $i\_SDSS - i\_GROND = (-0.031 \pm 0.005) + (0.113 \pm 0.014) * (r\_SDSS - i\_SDSS)$ ,

$i_{\text{GROND}}$  can be calculated via

- $i_{\text{GROND}} = 0.031 + 1.113 \cdot i_{\text{SDSS}} - 0.113 \cdot r_{\text{SDSS}}$