MAIN INJECTOR SEXTUPOLE STRENGTH – REASSESSMENT

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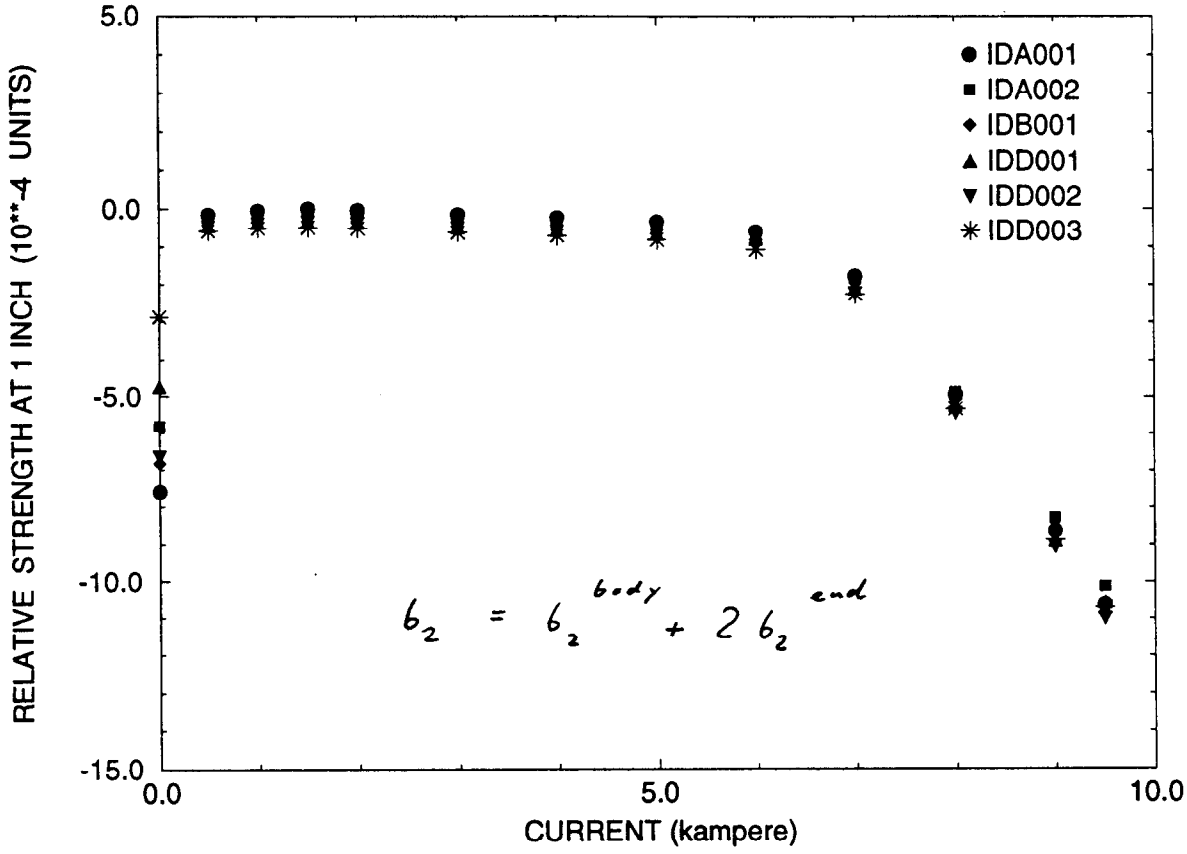
Previous study of the sextupole strengths required to maintain specific chromaticity program (reported in MI–0064) was carried out assuming sextupole content (body contribution) measured for the prototype dipole magnet IDM002 plus the sextupole end-field contribution measured for the end-pack # 9. The end-field sextupole contribution (b_2) turned out to be positive, $b_2 = 0.1$ m^{-2}. Here, the sextupole strength calculation is repeated for new sextupole measurements done on the six new prototype dipoles (IDA001, IDA002, IDB001, IDD001, IDD002, IDD003). Now, the end-field sextupole contribution (b_2) turns out to be negative, in the extreme case for the IDD003 dipole $b_2 = -0.05$ m^{-2}. The changes in the required correcting sextupole strengths are at the level of 1% (compared to the previous assessment MI-0064)

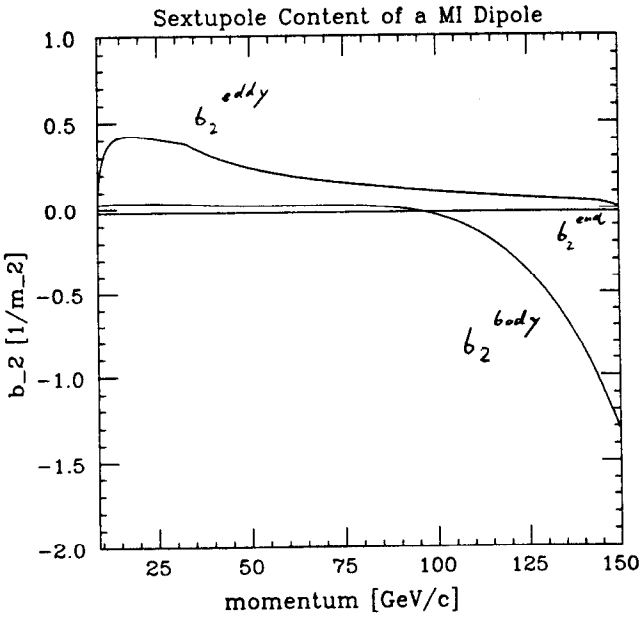
b_2

NORMAL SEXTUPOLE FROM HARMONIC COIL MEASUREMENT

IDA001, IDA002, IDB001, IDD001, IDD002, IDD003

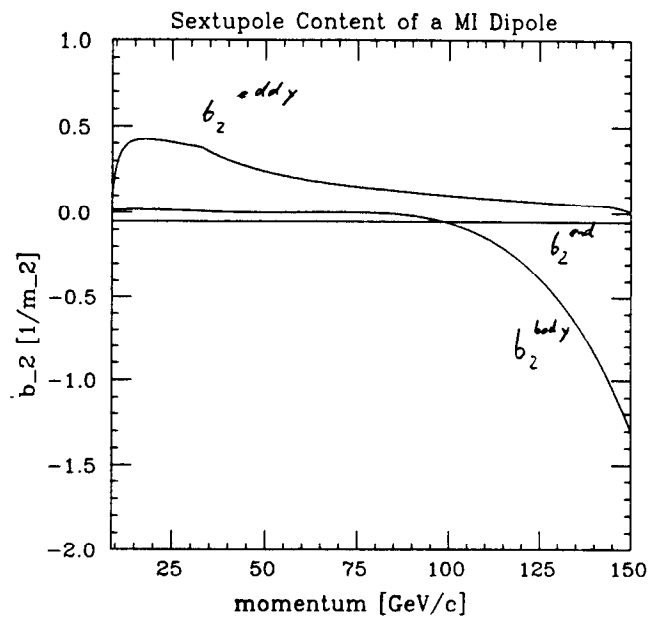


• IDA001



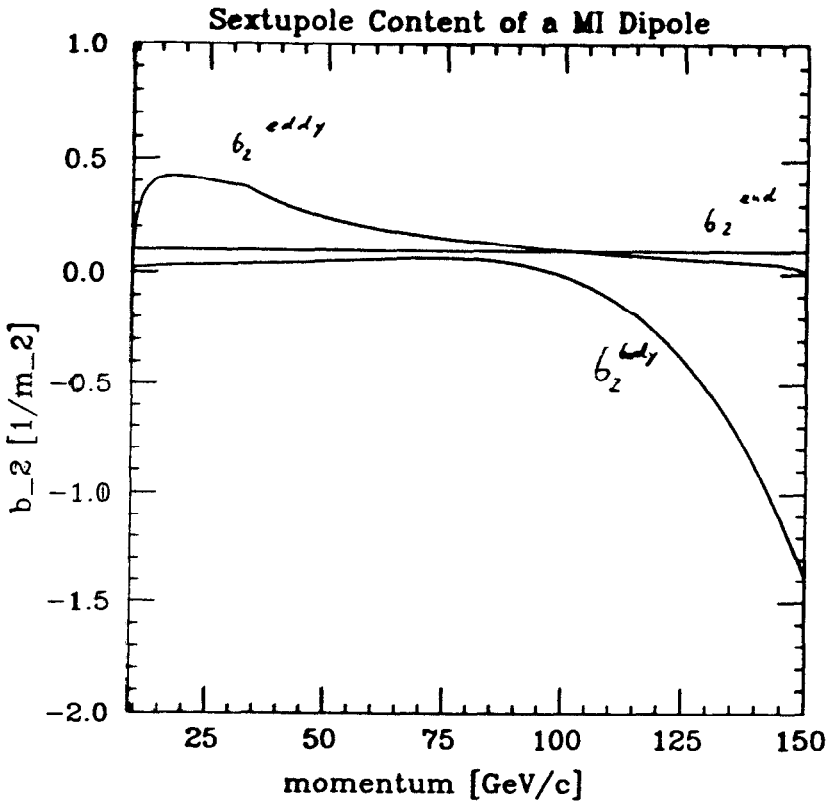
$b_2^{end} = -0.025$

• IDD003



$b_2^{end} = -0.05$

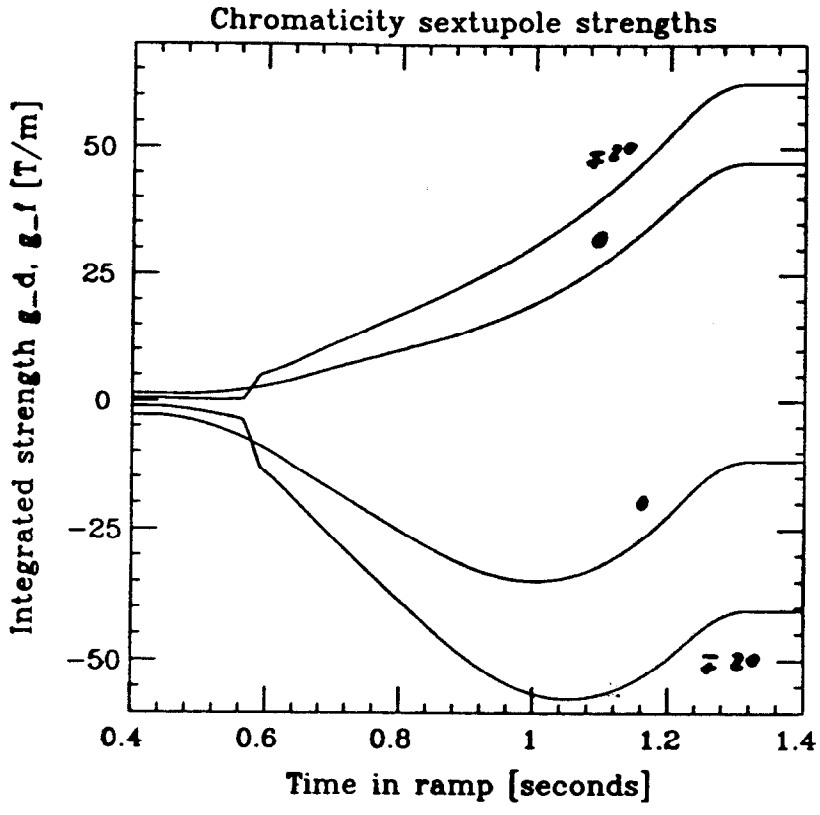
IDM 002 + end pack # 9



$b_2^{end} = 0.1$

IDM 002 + end part 9

150 GeV



$x = \mp 20$

$I_f^{max} = 333$ Amp

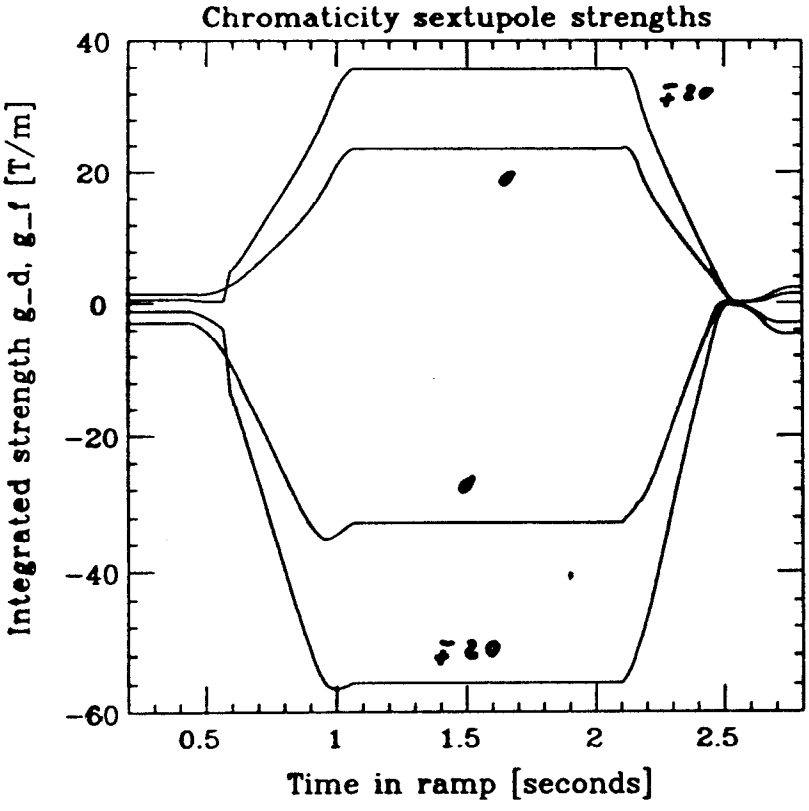
$I_d^{max} = -306$ Amp

$x = 0$

$I_f^{max} = 252$ Amp

$I_d^{max} = -186$ Amp

120 GeV



$x = \mp 20$

$I_f^{rms} = 131$ Amp

$I_d^{rms} = 213$ Amp

$x = 0$

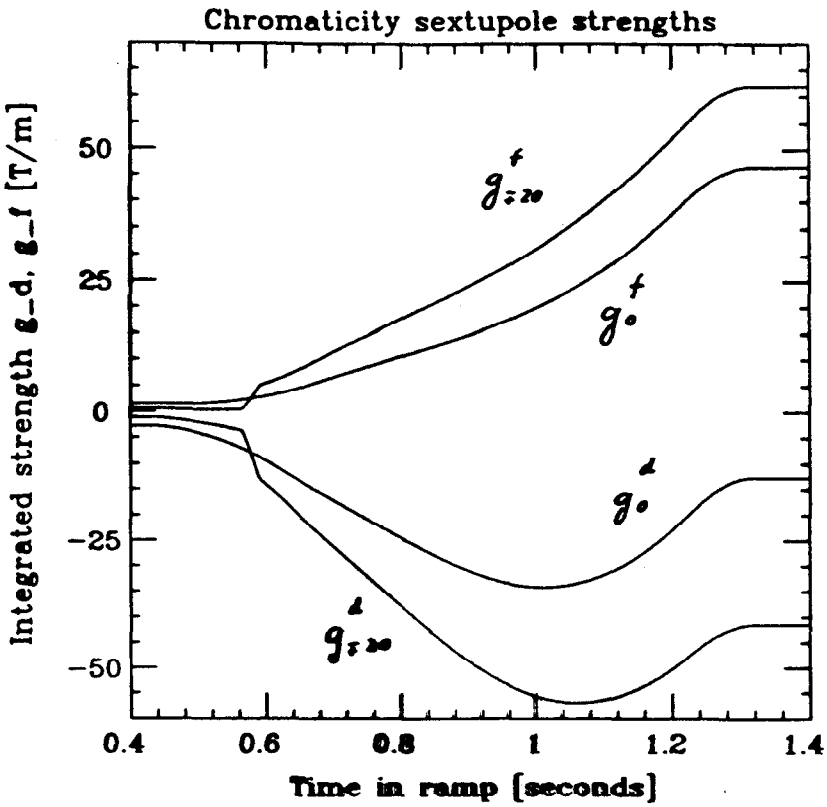
$I_f^{rms} = 86.0$ Amp

$I_d^{rms} = 128$ Amp

IDA001

dipole

150 GeV



$x = \mp 20$

$I_f^{max} = 331$ Amp

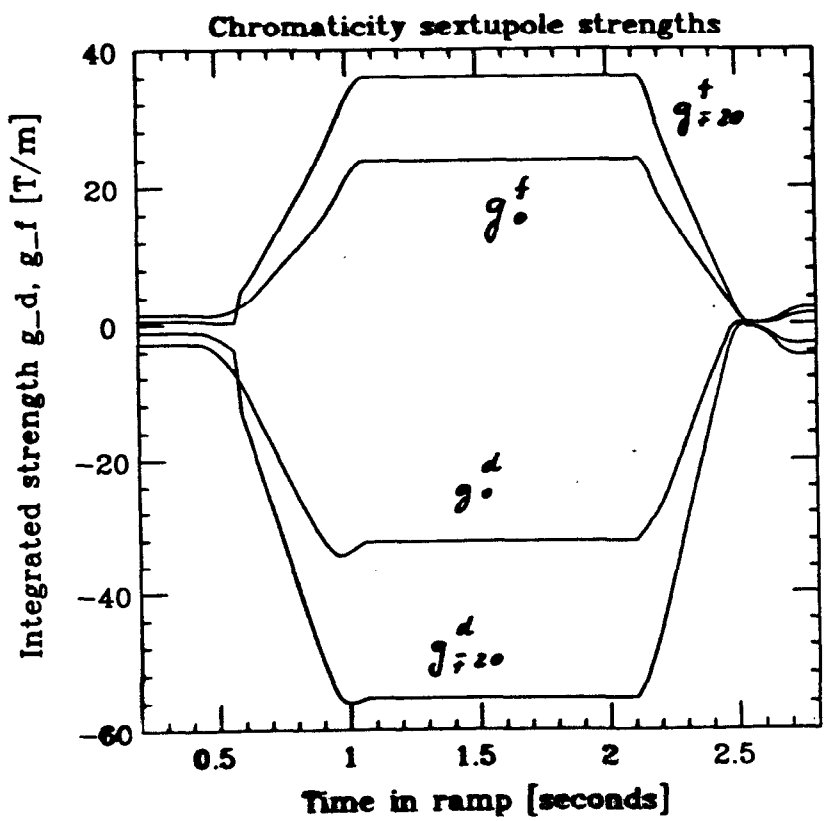
$I_d^{max} = -304$ Amp

$x = 0$

$I_f^{max} = 249$ Amp

$I_d^{max} = -183$ Amp

120 GeV



$x = \mp 20$

$I_f^{rms} = 133$ Amp

$I_d^{rms} = 211$ Amp

$x = 0$

$I_f^{rms} = 87$ Amp

$I_d^{rms} = 125$ Amp