



MP-II

Memory footprint

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Metrics

- ★ MillePede: base 10
 - $1 \text{ GB}_{10} = 10^9 \text{ bytes}$
- ★ Hardware: base 2
 - $1 \text{ GB}_2 = 2^{30} \text{ bytes} = 1.074 \cdot 10^9 \text{ bytes}$
- ★ For overhead (like OS) 7% left

CMS use case today

- ★ *Cosmics, MinBias for curved sensors (F. Meier)*
 - ▶ Several million tracks
 - ▶ 8 (9) parameters per strip (pixel) sensor $\rightarrow n_{\text{par}} = 200\text{k}$, matrix ($\approx 0.5 \cdot n_{\text{par}}^2$) with $2 \cdot 10^{10}$ elements
 - ▶ 4 billion (20%) non zero elements
 - ▶ compressed to 18.5 GB₁₀ (38.5%)
 - ★ compressed sparsity structure
 - ★ rare off diagonals (≤ 10 entries) in single precision

CMS use case tomorrow

- ★ Minimal compression !

- ▶ Only sparsity structure, keep matrix in double
→ reduction to 80% (instead of 40%) **Factor 2**

- ★ More/different data sets !

- ▶ Easily 30% (instead of 20%) non zero off diagonal elements **Factor 1.5**

- ★ More parameters ?

- ▶ For example (re)check cubic components in sensor surface: 12 (instead of 8) parameters **Factor 2**

Summary

- ★ Today

- Alignment squeezed into 20GB (24 avail. @PSI)

- ★ Tomorrow

- Factor 3 more easily envisaged

- ★ Should go for 60GB