

# Data compression in the ROD

## Motivation:

- Only way to reduce the number of *ROBINs* & ROD → ROB links.
- One possible way to reduce the total data volume on tape.

## Proposed implementation:

- *Lossless compression* of the fixed-length energy block.
- Transmission of uncompressed E and t,  $\chi^2$  for channels with  $E > E_{\text{cut}}$ .

### ROD Event Size (words)

	Min. baseline	This proposal
Header, trailer, control words	17	17
Block 0 Energy for all channels	128	~ 26.0 compressed
Block 1 Channels with $E > E_{\text{cut}}$	12.8 (t, $\chi^2$ )	25.6 (E, t, $\chi^2$ )
Total	~160.0	~70.0

## **Implementation details**

- May use Rice compression:
  - Can use very simple preprocessor: only the mapper is needed.
  - Could be implemented in a DSP or FPGA.

## **References:**

- Compression of EM Calorimeter Data  
<http://home.cern.ch/simions/compression/compression.pdf>
- The *CCSDS Blue Book* and the *CCSDS Green Book* on Lossless Data Compression
- D. Giunta and V. D'Arrigo *ESA Report*