ATLAS Units

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- Rule 1: No numbers dispersed in the code
    - All values of constants, dimensions, defaults, cuts, etc. must be grouped in well-identified places:
    - the geometry, calibration and alignment constants must be in the geometry/conditions data base;
    - all numbers relative to a single algorithm must be in a single (header?) file and assigned to variables with appropriate, meaningful names.

- Rule 2: Adopt the CLHEP SystemOfUnits header file
    - The SystemOfUnits.h header, with the unit definitions, must be included in all places where there is any number.
    - Only two basic units differ from current (Geant3 inherited) practice:
        - millimeters for length
        - MeV for energy
    - These units will also be used for the persistent representation of all ATLAS data.

- Rule 3: All numbers come with units
    - All numbers come with the units in which they are specified.
    - Examples:
        - double pixelLength = 400 * micrometer;
        - double pT_Cut = 1.0 * GeV;
        - double coolingFluidPressure = 2 * bar;

- Rule 4: Interfaces with external packages
    - Some external packages are beyond our control and use their own systems of units, no way to change that. Wherever this happens, a well-defined interface to the rest of our code must be defined.

- Rule 5: Reference frame
    - The ATLAS reference frames are defined in the TC document
      http://edmsoraweb.cern.ch:8001/cedar/doc.info?document_id=ATL-GE-QA-2041

- Rule 6: Range of φ
    - For most applications, it is irrelevant to specify the range of φ: $(-\pi,+\pi]$ or $[0,2*\pi)$.
    - In practice, φ is calculated mostly through the arc tangent function, which returns angles in the range $(-\pi,+\pi]$ both in Fortran and in C/C++ (CLHEP methods in particular returns phi() in this range).
    - We therefore choose the φ range as $(-\pi,+\pi]$. Care has to be taken when filling histograms or calculating $\Delta\varphi$.