Paul's Description of Z, undulator Z, Effective Length etc, in LCLS

The "Definition of the S-Coordinate for graphical plots along the LCLS beamline", is at http://www-ssrl.slac.stanford.edu/lcls/prd/1.1-103-r0.pdf

The SUML is the beam path length (as the "crow" flies), including all curves and bumps along the way.

The "LINAC" Z-coordinate is a line along the linac axis, and parallel to it.

The "UNDULATOR" or "LCLS" Z-coordinate (also called Z') is a line along the undulator axis, and parallel to it.

Note the linac axis is pitched downhill about 0.3 degrees while the undulator is not, so this is why we have two Z coordinates (linac-Z and undulator-Z).

These coordinates are described in an LCLS tech note at:

http://www-ssrl.slac.stanford.edu/lcls/technotes/lcls-tn-03-8.pdf

The length of a device is included in the EXCEL MAD-output file...

http://www-ssrl.slac.stanford.edu/lcls/linac/optics/lcls.xls

...under column "F", called "L_EFF". For magnets, this is the magnetic length, not the physical length.

Note that the Z-coordinate in this EXCEL file is labeled as "X Coor" at the top of the column. I'm' sorry for this, but the mechanical designers wanted to call it this to fit with their Solid-Edge program. You can look at the bottom of the EXCEL column to see the "z" label shown there.

The "LCLS" Z-coordinate is used in the "LTU" EXCEL file at:

http://www-ssrl.slac.stanford.edu/lcls/linac/optics/ltu.xls

The index page with links to these EXCEL files notes which coordinates are used ("linac" or "LCLS"):

See http://www-ssrl.slac.stanford.edu/lcls/linac/optics/.

I know it's a bit much, but that's the story.