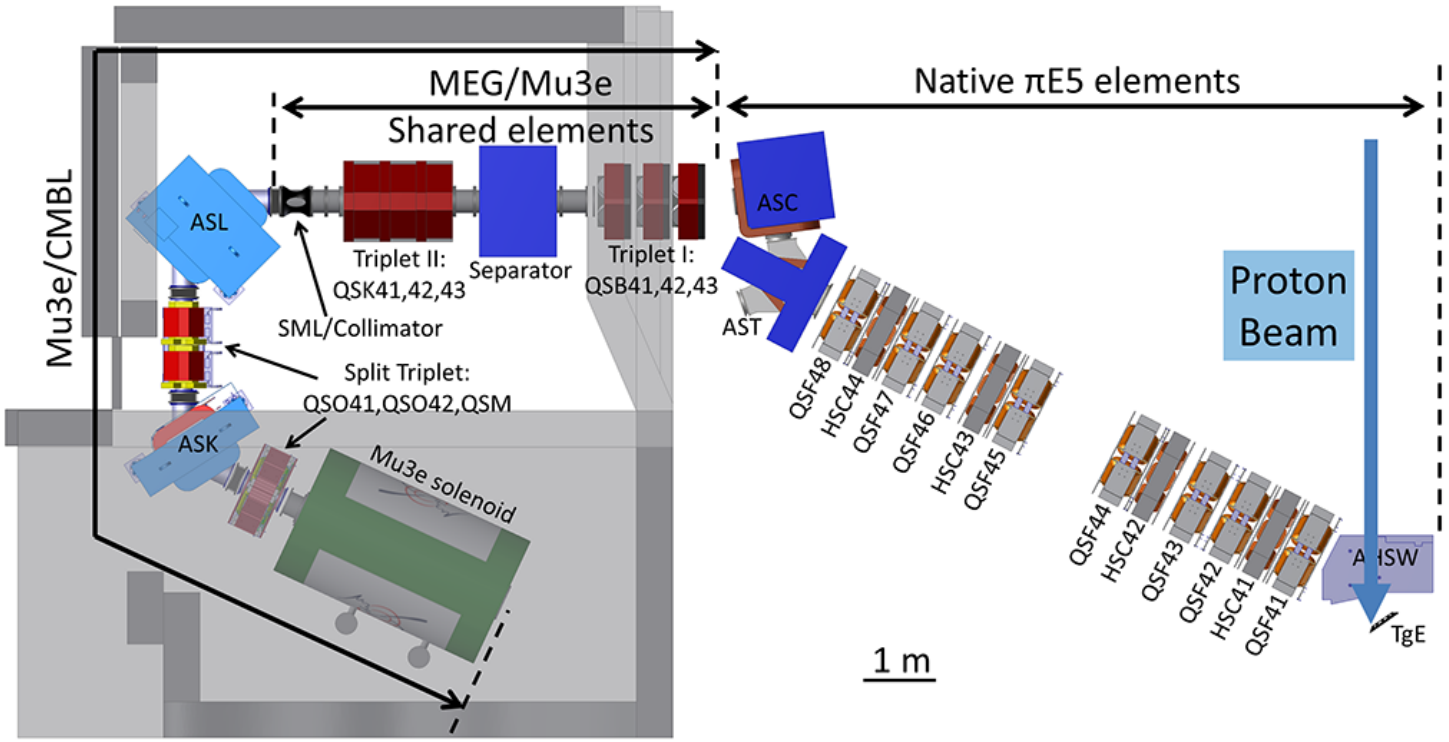
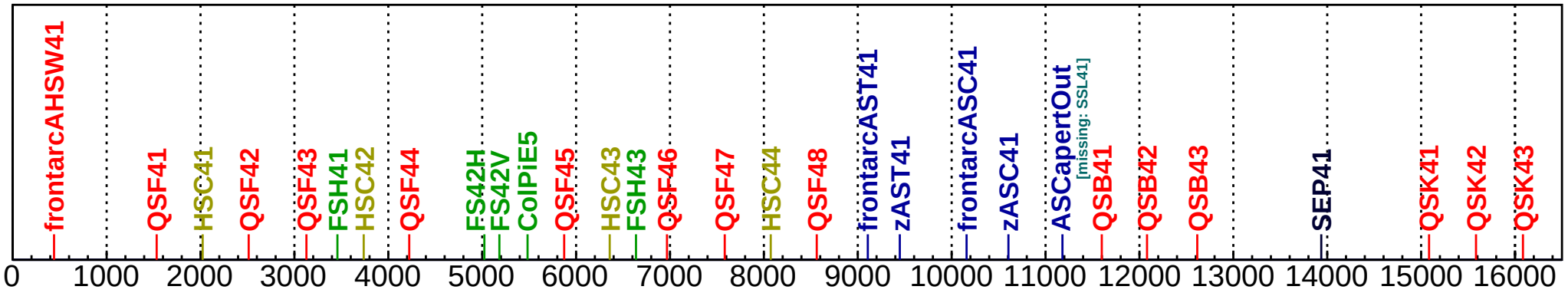
PIONEER πE5 G4BL

- GEANT4 based 'parametrized' beamline simulation
  - particle tracking through beamline, starting from p hitting target
  - magnet positions and fieldmaps
- Zachary Hodge, Felix Berg, $et\ al.$
- current (public) repository github.com/ursl/pioneer-g4bl



Beamline placements

- Illustration of placements in G4BL
  - lines show center positions (normally)
  - validation of positions?
  - missing (at least) one component, SSL41



Fieldmaps and scale factors

Fieldmap	Comments
AHSW	made from 19 measured fieldmaps from Vjeran Vrankovic
QSF	calculated in Tosca January 2018
HSC	calculated in Tosca Middle/End of November 2014
AST	Tosca Feldkarte von Vjeran Vrankovic mit Mathematica auf blfieldformat gebracht
ASC	from Vjeran Vrankovic June 2014 Tosca for 100 A
QSB	calculated in Tosca Middle/End of November 2014
SEP	July 2015 (both E and B)
QSK	QSK calculated in Tosca 2018

Scale	Value	Comments
AHSW	-1/360	fieldmap measured 360 A from Vjeran |y|<10
QSF	-1/100	TOSCA calculation January 2018
HSC	1/0.6	real G/A factor 9.158 - fieldmap calculated (TOSCA) for 0.6 A - TOSCA point G/A factor 9.7 or 9.1 from fit in x=+-200 range - 8.8-9.3 dependent on fit range
AST	1/250	fieldmap calculated (TOSCA) for 250 A
ASC	-1/100	fieldmap calculated (TOSCA) for -100 A
QSB	-1/4.70973	TOSCA model equivalent current 4.70973 A (no coil info available . . .)
SEP	1	find this value
QSK	1/40	TOSCA calculation spring/summer 2018

- Combined into 'current' argument for fieldmap placements
  - e.g., current = $scaleMom*$QSF41set, $QSF41set=($QSF41cur+$deltaQSF41cur)*$sign*$scaleQSF

PIONEER πE5 currents

- Comparison of (example) setpoint currents with (default) G4BL
  - various setpoint files
  - HSC42 set to 0 in 2022
  - 'current' $\equiv$ value passed as argument when placing fieldmap