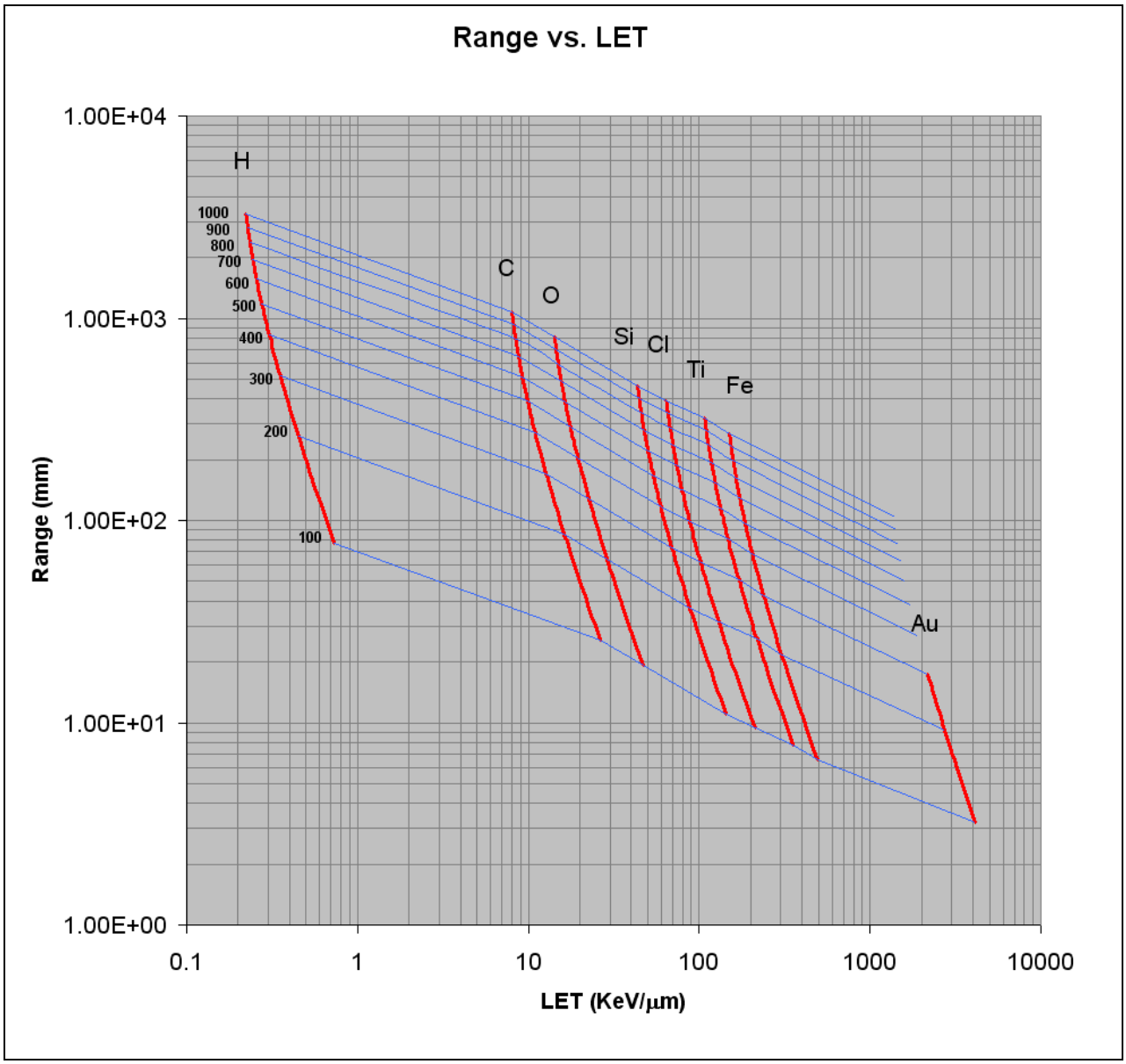
NSRL Beams

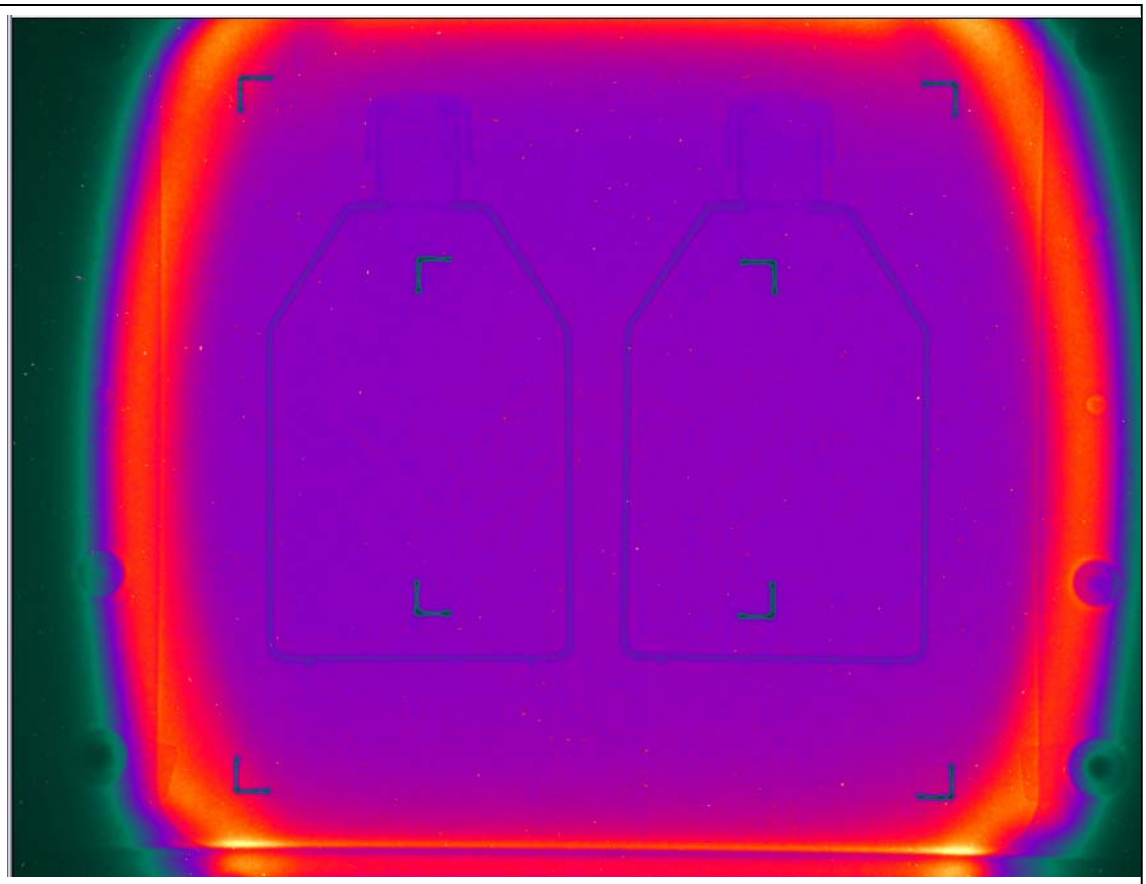
The figure below is a summary of all LETs and ranges in water for all ions used in NSRL to date. Energies are indicated, without units, on the left hand side of the H line. The units are MeV/n.

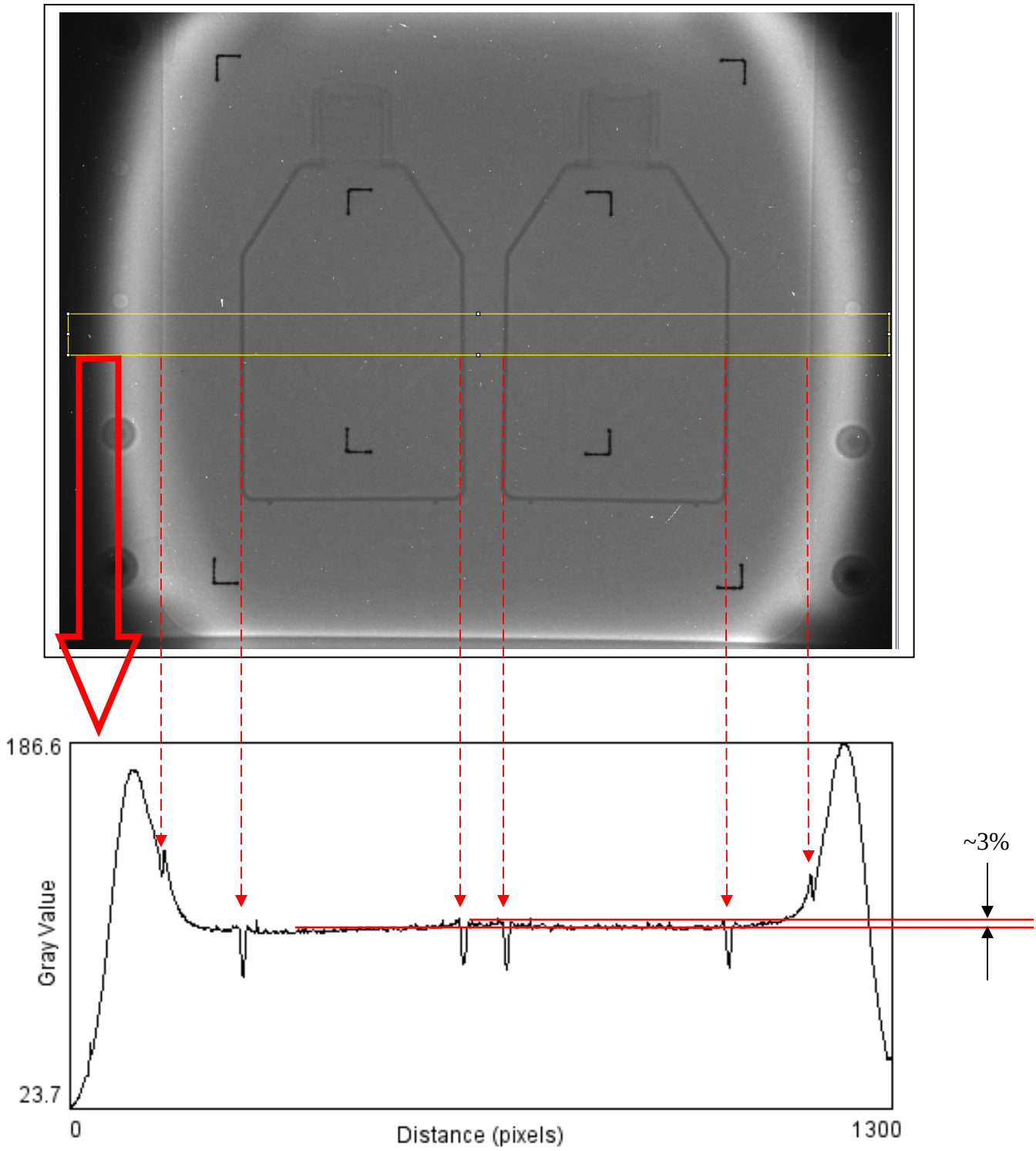
Note that Bragg curves can be produced for ion/energy combinations which have a range less than 46 cm.



Dose rates are from a few Gy/minute down to a few $10^2/(cm^2$ spill), for all but the Ti and proton beams. For Ti, the maximum is around 1 Gy/minute, while for protons 0.8 Gy/minute is a hard-to-achieve maximum. A more typical rate would be 0.4 Gy/minute.

Dose rates increase with decreasing energy due to rising LET, but the machine becomes less efficient at lower energies, so that less beam is available.
The rates quote d above a re for a $20 \times 20\,\text{cm}^2$ beam, a sample of which is show n below.



A beam image, taken with the Digital Beam Imager, and displayed in pseudo-color. Two T75 flasks are positioned in a foam holder (transparent to the beam), itself held in an aluminum frame, which is very faintly seen along the bottom and sides. Beam uniformity in the working area is good, as can be inferred from the uniformity in color. The bright lines along the edges of the beam are the “ears” of higher beam intensity, an artifact unique to the method employed to create the flat field in the middle.

Same image, in black-and white. We use the software ImageJ to analyze the intensity distribution, projecting the slice inside the yellow rectangle. Beam intensity varies about 3% of the intensity at the center over the flat region.