

2/21/01

## Discussion of Drive Laser Frequency

Attendees - Mike Browne, Ron Akre, Eric Colby, Dennis Palmer, Bob Siemann

The choices are between 79.3 MHz and 76.5 MHz. The numerology for these two frequencies are

### **79.3 MHz**

- 1)  $79.3 \times 6 = 476$  = SLAC drive line frequency
- 2)  $79.3/8.5 = 9 \frac{1}{3}$  so it is not a harmonic of the 8.5 MHz which is the damping ring frequency, and more importantly for ORION the frequency used to generate timing fiducials
- 3) 79.3 is in the middle of the frequency bandwidth for Ti:Sapphire lasers

### **76.5 MHz**

- 1)  $476/76.5 = 6.22$ , so the 76.5 is not a subharmonic of the drive line frequency and any phase-locked loops would have to divide down to a common frequency first
- 2)  $76.5/8.5 = 9$  so it is a harmonic of 8.5 MHz and there would be no issue of modifications to the fiducial generation
- 3) 76.5 is at the lower end of the frequency bandwidth for Ti:Sapphire lasers

Points 1 & 3 favor 79.3 while point 2 favors 76.5. There is an additional factor that favors 79.3 which is the LCLS decision to use that frequency, but this is not a strong constraint as we will be developing our system before they do.

There appears to be an easy solution to the fiducial generation issue that was suggested by Mike Browne. The present 8.5 MHz output from the countdown unit can be reduced to  $8.5/3 = 2.833$  MHz without affecting PEP or any anticipated damping ring application.

***Conclusion of meeting: We will specify 79.3 MHz as the drive laser frequency***