Closing Remarks

- **Reports** from many facilities & proposals *FERMI-LCLS-FLASH-XFEL-SACLA-SCSS-SPARC-Lunex5-SINAP-SDUV-DCLS-SXFEL*
- **HGHG** Recent work presented from *FERMI, SDUV, SPARC, LBNL.* Mature technique, up to 13th h beam time to users (FERMI), conversion up to 27thh in single stage demonstrated, up to h 65th (FERMI) demonstrated in harmonic cascade mode
- **HGHG + Fresh bunch** *FERMI,* demonstrated -FEL-2 commissioned with h24 (eg. 8x3 up to 100 uJ) also in SDUV experiments on fresh bunch ongoing
- **EEHG:** *SLAC SDUV* Demonstration experiments as 1 year ago, harmonics up to 7, demonstrated low sensitivity to energy spread, IBS & ISR set a conceptual limit on h, limiting factors still very large h=100-200), waiting for ECHO 75 @SLAC & h20@SDUV …. ECHO150@SXFEL
- **Self Seeding** *LCLS-SACLA-XFEL-PSI* Planned & studied – Reasons of large flucutations on the way to be understood - implemented in Hard X-ray @LCLS – 3x more brightness than SASE - users beamtime – designed for Soft X-Ray Coll. SLAC-LBNL-PSI
- **HHG Seeding** S-FLASH – SCSS – SPARC (Demonstrated, @SCSS Beamtime to users in summer 2013, Demonstrated also in HGHG mode at long wavelengths)
- **Ideas** on pulse shaping, mode locking, temporal coherence, two pulses seeding, two color – Harmonic suppression - RAFEL (SPARC – Strathclyde) – Zettosecond pulses

- Interesing discussions (e.g. on longitudinal coherence – and its relation with Fourier Limit)