



CompactLight Parameters

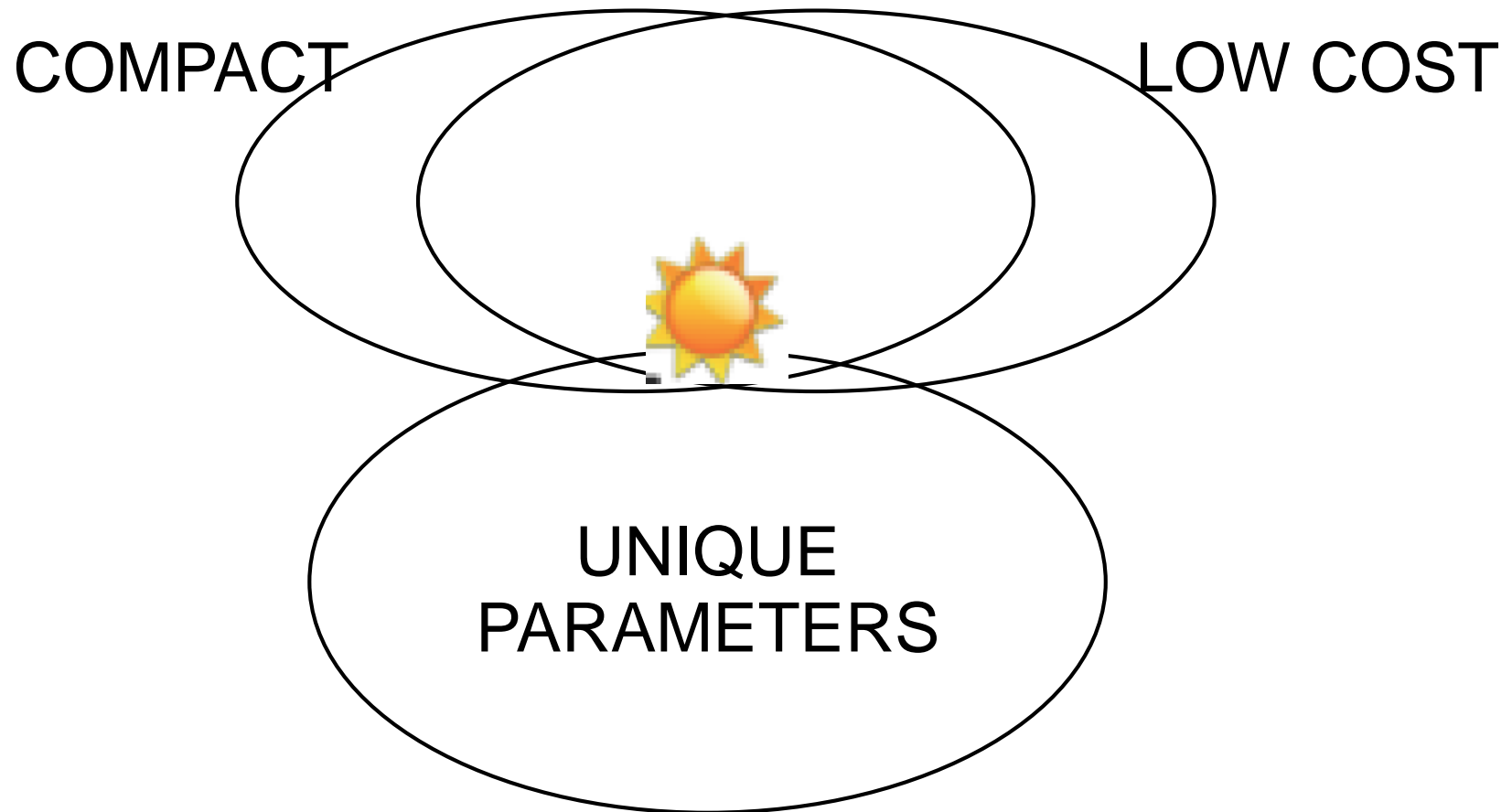
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**The CompactLight prime objective is to generate a compact
& low cost FEL facility design**





Notes

- Stability in all aspects is very important to the users. We will bear this in mind in all of our technical designs.
- Seeding will be implemented at all wavelengths, where feasible, and compatible with our compact and low cost objective.
- Peak Brightness is key to users and we will aim to maximise this when compatible with our compact and low cost objective.
- Synchronisation is key to users and we will provide a design that can synchronise FEL & laser to at least 10fs
- Two pulses and two colours are required by many users. We will develop a design that provides these capabilities in as compact and low cost way as possible.
- Generating pulses as short as 100 as may take significant extra space and cost. In this case we will relax the specification to a point where the cost impact is negligible.
- A repetition rate of 1000Hz will be a unique and desirable feature of our design and we recognise that this is a very challenging target that we may have to reduce during the study.
- The bandwidth should be minimised where compatible with our compact and low cost objective.
- The 2keV “boundary” between SXR & HXR FEL is not fixed and will be determined by the project when considering the technical solutions (e.g. beam energies and undulator tuning)
- Tuning across photon ranges will primarily be achieved using undulator scanning instead of energy scanning. We will operate the FELs at a few fixed energies if required to achieve the full tuning ranges.
- The output pulses will be evenly spaced, not in a burst mode.
- “Low cost” includes cost to operate as well as build.
- Simultaneous operation of both FELs would be beneficial.
- Photon numbers will be competitive with similar facilities, we understand that the photon number will reduce at the shortest pulses (as they do at other facilities) and we will remain competitive



CompactLight Specification

	Soft x-ray	Hard x-ray
Photon energy [keV] (min-max)	0.25 - ~2	~2 - 16
Wavelength [nm] (max-min)	5 - 0.6	
Repetition rate [Hz]	1000	100
Maximum pulse energy [mJ]	Competitive with other FELs	Competitive with other FELs
Number of photons		
Pulse duration [fs]	0.1 – 50	
Polarisation (at experiment)	Variable, selectable	Variable, selectable
Two-colour pulses: time separation [fs]	-20 -> +40	
Two-colour pulses: photon energy variation (max. of E2/E1)	2 (270-530eV), 1.2 for the rest of the range	1.1