**Preliminary EuPRAXIA@SPARC\_LAB Parameter List v4**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Units** | **Xband**  **FEL-SASE**  **1 GeV** | **EuPRAXIA**  **FEL-CDR**  **1 GeV**  **Witness bunch** | | **PWFA 2**  **FEL-SASE**  **1 GeV**  **1 Drive bunch** | **PWFA 4**  **FEL-SASE-COMB**  **1 GeV**  **4 Drive bunches** | | | | **LWFA**  **External Injection**  **1 GeV**  **Laser Parameters** |
| **No.bunches** |  | 1 – (maybe 2) |  | | 1 | 4 | | | |  |
| **Bunch separation** | ps | (maybe 83) |  | | 1. | 1.67 | 1.67 | 1.67 | 0.5 |  |
| **Rep. rate** | Hz | 10 – 100 | 10 | | 10 | 1 | | | |  |
| **Injector energy** | GeV | 0.15 | 0.15 | | 0.15 | 0.15 | | | |  |
| **Xband Acc. Gradient** | MV/m | > 70 | > 70 | | > 70 | >70 | | | |  |
| **Exit linac energy** | GeV | 1. – (1.5) | 0.5 | | 0.5 | 0.5 | | | |  |
|  |  |  |  | |  |  | | | |  |
| **Plasma density** |  | / |  | |  |  | | | |  |
| **Acc. Gradient** |  | / |  | |  |  | | | |  |
| **Norm. Bunch density** |  | / |  | |  |  | | | |  |
| **Norm. Charge** |  | / |  | |  |  | | | |  |
| **Transformer Ratio** |  | / |  | | <2 |  | | | |  |
|  |  |  |  | |  |  | | | |  |
|  |  |  | **2016** | **2017 ?** |  | B1 | B2 | B3 | B4 |  |
| **Rms Energy Spread** | % | <1. | <1 | <1 | < 1 | 0.1 | 0.1 | 0.1 | 0.1 |  |
| **Peak current** | kA | 2. | 3 | 1.5 | 1.8 | 0.15 | 0.24 | 0.3 | 0.36 |  |
| **Bunch charge** | pC | 100 | 30 | 10 | 200 | 50 | 80 | 100 | 120 |  |
| **Bunch length rms** | m (fs) | 15 (50) | 3 (10) | 2 (7) | 34 (112) | 50  (167) | 50 | 50 | 50 |  |
| **Rms norm. emittance** | m | < 1. | <1.5 | <1 | < 2 | 3 | 3 | 3 | 3 |  |
|  |  |  |  |  |  |  | | | |  |
| **Slice Length** | m | 0.7 | 0.75 | 0.75 |  |
| **Slice Charge** | pC | 4.5 | 7.5 | 3.7 |  |
| **Slice Energy Spread** | % | 0.1 | 0.1 | 0.1 |  |
| **Slice norm. emittance** | m | 0.5 | 1 | 0.5 |  |
| **Undulator period** |  | 1.5 | 1.5 | 1.5 |  |
| **K** |  | 1 | 1 | 1 |  |
| **** | x 10-3 | 1.2 | 1.1 | 1.1 |  |
| **Radiation wavelength** |  (KeV) | 3. (0.4) | 3. (0.4) | 3. (0.4) |  |
| **Saturation length** | m | 22 | 26 | 27 |  |
| **Saturation power** | MW | 940 | 1210 | 492 |  |
| **Energy** | J | 47 | 12 | 3.3 |  |
| **Photons/pulse** | x 1010 | 70 | 17. | 4.8 |  |