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Abstract

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **5-m Undulators** | **SASE1 & 2** | | | **SASE3** |
| # of Segments | 35 | | | 21 |
| Max. K-parameter @10mm | ≥ 3.9 | | | ≥ 8.0 |
| End kicks By and Bz | ≤ │0.15T.mm│ | | | |
| RMS Phase jitter | ≤ 8° | | | |
| **Diagnostic Undulators** | |  | |  |
| Period length |  | | 40 mm | |
| Peak Field |  | | 0.916 T | |
| K-parameter |  | | 3.28 | |
| Number of poles |  | | 8 | |

Aaa Aaaaaaaa AAAA AaaA aa a aaa A-aaa AAA aaaa aaaaaaaa aaa aaaaaaa aaaaaa aa 2017. Aaaaa aaaaaaa aaa AAAA Aaaaaaaaa Aaaaaaa aaaaa aa aaaaaa AaAaA aaaaaaaaa aaaaaa aaaaaaaaaa aaaa aaaaa. Aaaaaaaaa aaaaaa aaa aa aaaaaaa aaaaaaaaa aaaaaaa aaa aaaaaaaa aaaaaaaaaa aa aaa aaaaaaaa aaa aaa aaaaaaa aa aaa AAAA aaaaaaa. Aaaaaaaaaa aaaaaaa aaa aaaaaaaa aaaaa aa aaaaa aaaaaaaaa aaaaaaa aaa aaaa AAAA aaaaaa aa aaaaaaaa aaaa a aaaaaaaaaa aaaaaaaaa (AA). Aa aaaaaa aa aaa aaaaaaa aa aaa aaaaaaaa aaaaa aaaa aa aaa aaaaa aaaa aa aaa Aaaaaaaaa Aaaaaaa aaaaaaaaa. Aaaaaaaa aaaaa aaaaaaaaaaa aaaaaa aaaa 3.5% aa aaa AA aa aaaaa aaa aaaaaaaaaa aa aaaaaaaa aaaaa aa aa 4.4 aAa. Aa aaaaaaa aaaaa aa 55 Aa aaa aaa 5-a aaaaaaaaa aaaaaaaa aa aaaaaaaaaaa aaaaa aa aaa aaaaaaa A-aaaaaaaaa aaaaaaaaaaaaa aaa aaaa aaaaaaaaa.

Introduction and methods

Aaa Aaaaaaaa AAAA (AAAA.AA) aaaa a aaaaaaaaaaaaaaa aaaaaaaaaaa aa aaaaaaa aa aaaaaaaa aa aa 17.5 AaA aaaa a aaaaaaaaaa aaaa aa aa 27000 aaaaaaa aaa aaaaaa aaa aa 1aA [1]. Aaa aaaaaaaaaaa aaa aaa aaaaaaa aaaa aaaaa aaaaaaaaa aa aaaaaaaaa aaaaaaaaa. Aaaaa aaaaaaa aaa AAAA Aaaaaaaaa Aaaaaaa aaaaaaa AAA aaaaaaaaa aaaa aaaaaaa aaaaaaaaaa aaaa 0.05 aa 5.2 aa aaa aaaaa aaaaaaa aa aaaa aaaa 100 aa [2]. AAAA1 aaaaaaaa aaa aaaaa aaaaaa aa Aaa 2017 aaa aa aaaaaaaaa aa aaaa aaaaaaaaa. AAAA3 aaaaaaa aaaaaa aa Aaaaaaaa 2018 aaa AAAA2 aaaaaaa aaaaaaaaaaaaa aa Aaaaa 2018. Aaa aaaaaaaa aaa aaaaaaaaaaaa aaaaaaa aaaaaa aa 14 AaA aaaa 10-3000 aaaaaaa aaa aaaaaa aaa aa 0.25-0.5 aA [3]. Aaaaaaa AAAA1 aaaaaa aaaaaa aa 9.2-9.3 aaA aaaa 1 aA aaaaaaaaa.

A aaaaa aa 91 5-aaaaa aaaa aaaaaaaaa aaaaaaaa aaaaa aa aaaaaa AaAaA (AAAAAAA 776AA) aaaaaaaaa aaaaaaa aaaa aaaaa aaaaaaaaaa aaaaa aaaaaaaaaaaaaa aa aaaaa aa aaaaaaaa aaa AAAA aaaaaa (aaaaa 1). Aaa aa-aaaaaaaaaaaaa aa aaa aaaaaaaaa aaaaaaa aaa aaaa aaaaaaaa aa aaaaa aaaaaaaaaa [4-10] aa aa aaaaaa aaaaaa aa aaaaaaaaa aaaaaa. Aaaaaaa, aaa aaaaaaaaaa aaaaaa aaa aaaaaaaa aaaaaaaaaaa aaa aaa aaa aaaaaaaaaa aaaaaaaaaa aa aaaaaaaaaa aaa aaaaaaa aaaa aaaa aaaaaaaa [11-13] aa aaa aaaaaaa aaa aaaaaaa aaaaaaaaaaa aa aaa aaaaaaaaaaa aaaaaaaaa.

Aaa aaaaaaaaa aaaaaa aa aaa AAAA.AA Aaaaaaaaa Aaaaaaa aaa aaaaaaaa aaa aaaaaaaaa aaaaaaa aaaaaaaaaa aaaaaaa aaaa aaaaaaaa [14,15]. Aaaaa aaaa, aa aaaa aaaaaaaa aa aaaaa aa aaaaaaaaaa [16] aaaaa aa aa-aaaa aaaaaaaa Aaaaaaa aaa aaaaaaa AAA-800 aaaaaaaaaa. Aaa Aaaaaaa aaaaaa aa aaaaaaa aaa aaaaa aaaaaaaa aaaaa aaa aaaa aaaaaa aa aaa aaaaaaaa aaaa aa aaaa aaaaaaaaa aaaaaaa aaaaa aaaaa aaa aa aaaa aaaaaaaaaaaaa. Aaaaaaaaaaa, aaaa AAAA Aaaaaaaaa Aaaaaa aa aaaaaaaa aa aaa aaaaaaaa aaaa aaaa a aa-aaaaaa aaaaaaaaaa aaaaaaaaa (AA). Aaa AA aaaaaaaa aaa aaaa aaaaaa AaAaA aaaaaaaaa aa aaa 5-aaaaa aaaaaaaa. Aa aaa aaaa aaaaaaaa aaaaaaa (aaaaa 1) aaa 12 aa aaaaa aaa. Aaaa a aaaaa aaaaaa aa aaaaa 300 aa aaa aaaaaa aa 47 Aa, aaa AA aaa aa aaaaaaa aa aaaaaaaaaa aa aa aaaa aaaaaa aa aaaaaaaa aaa aaaaaaaa aa-aaaaaaaaaaaa aa aaa aaaaaaaa aaaaaaaaaa aaaaaa aaaaaaaaaaa aaaa aa aaaaa.

Table 1: AAAA.AA Aaaaaaaa Aaaaaaaaaaaaaa

Aa aaaa aaaaaaaaaa aa aaaaaa aa aaa aaaaaaaaaaaaaaa aa aaa aaaaaaaa aaaaa aa AAAA1 aaa AAAA3 aaa aa aaa aaaaaaaaaa aa-aaaaaaaaaaaaa aaaaaaa aaaaaaaa aa aaa aaaaaaaaaa aaaaaaaaaa aaa aa aaa 5-a aaaaaaa aaaaaa aaa aaaaa aaaa aa aaaa aaaaaaaaaaaaa/aaaaaaaaa.

Absorbed doses Characteristics

Aa aaa AAAA.AA aaaaaaaa, aaa AAAA3 aaaaaa aa aaaaaaa aaaaaaaaaa aa aaa AAAA1 aaaaaa. Aaa Aaaaaa aaaaa aa aaaa aaaaaaa aaa aaaaaaaaa aaaaaaaaa aaaaa aaa aaaaa aa AAAA1 aaaaaaaaaaaaa aaaa aaa aaaaaaaa aaaa aa aaaaaaaaaaa aaaaaaaaaa aaaaaaa aaaa AAAA aaaaaaa aaaaaa aaaaa aaaaaa.

Aaa aaaaa aa aaaa aaaaaaaa aaaa aaaa aaaaaaaa. Aaa aa-aaaaaa “aaaaaaaa aaaaaa” aaa aaaaaaa aa a aaaaa aaaa aa aaa aaaaaaaaaa aaaaa aaaaaa a aaaaa aaaa aaaaaaaa, aa aaaaa aa Fig. 1A aaa aaa aaaaa Aaaaaaa aaaaaaaaa aa aaa aaaaaaaaaa aa aaaa#3 aaa aaaa#4 aa AAAA1. Aaaaa aaaaaa aaa aaaaaa aaaa aaa aa aaaaaaaa aaaa aaaaaaaa, aaaaaa aa aaaa aaaaaa aa aaaaaaaaaa aaa aaaaaaaaaaa aaa/aa aaa aaaaa aaaaaaaaaa. Aaaaaaa aaaaa aaaaaaaa aaaaaa aaa aaaaaaaa aaaaaaaaaaaaaa aa aaaaaaa aaaaaaaaaa aaaaaaaaa aaaaaaaa aaa aaa aaaaa aaaaaaaaa aaaaa aa aaaa aaaaaaa aaaaaa aaaaaaa aaa aaaaaaaaaa aaaaaaaaa, aa aaaaaaaaaaaa aa Fig. 1A. Aaaaaaaa aaaaaa aaa aa aaaaaaaaa aa aaaaaaa aaaaaaaaaa aaaaaaa-aaaaaaaa aaaa aa aaaaaaa aaaaaaaaa aaaa aaaaaa aaa aaaaa aaaa aaaaaaa.

Aaa aaaaaa aaaa aaa aaa aaaaaaaa aa aaaaaaaa aaaaa aaaaaaaa aa a aaaa aaa aaaaaa aaaa aa a aaaaaaaa aa aaaa aaa Fig. 1A aaaaaaaaaaa aaaa aaaa aaa aaa 5-a aaaaaaa aaaaaaa aa aaaa#27 aa AAAA1. Aaaa aaaaaaaaa aa aaaaaaaaaaaa aaaa aaaaaa aaaaaa aaaa aaaaaaaaaa aa aaaaa aaaaaaaaaaaa aaaaaa aa aaa aaaaaa aa aaaa aaaaaaaaa. A aaaaa aaaaaa aaaaaaaa aaaa aaaa aaa aaaaaa aa aaaaaaa aa aaaa.

Figure 1: Aaaaaaaa aaaa aaaaaaaaa aaa “aaaaaaaa aaaaaa” (A) aaa aaa aaaaaaaaaa aaaaaa (A) aa aaaaaaaaa aaaaa aaaa 300 aa 1200 aaaaaaa aaa aaaaaa aaa 0.5 aA.

Aa aaaa aaaaaaaa aaa AAAA1 aaaa aaaaaaaa aaaaaa aaaaaa aaaa aaaaaaaaa aaaa aaa aa aaaaaaa aaaaa aaaaaaa aaa aaaaa aaaaaa aaaaa aa aaaaaaaaaaa aaaaaaa aaaa AAAA Aaaaaa. Figure 2 aaaaaaaaaa aa aaaa AAAA1 aaaaaaaaa aaaaaaa aaa aaaaa aaaaaaa aaa aaaa aaaaa aaa aaaaaa aaaaa aaa aaaaaaaa aaaa aaaaaaaaa aaaa aaaaaaaaa aaaaa aaaa 300 aa 5000 aaaaaaa aaa aaaaaa. Aaaaaa aaaaa aaaaaaaaaa aaa aaaaaaaa aa aaaaa#3-31 aaaa aaaaaa aa 12-13 aa aaa aaaaa aaaaaaaa aa aaaaa#32-37 aaaa aaaaaaaaaa aaaaaa aa 220 aa aaa. Aaa aaaaaaa aaaaaaa aaaa a aaaaaaaa aa aaaaaa aaaaaaaa aaaaa aa aaa aaaaaa aaaa aa AAAA1 aaaaa aaa aaaaaaaaaaa aa aaa aaaaaaaaa aaaa. Aaa aaaa aaaaaaaa aa aaaa aaaaaaaaaa aaaaaaa aa aaaaa aa aa aaaaaaaaaaaaa aaaaaaaaaaaa aa aaa aaaaaaaaaaa aaaaaa aaaaaaa AAAA1.

Aaaaaa aaaaaaaa aaaaa aaa aaaaa aaa aaaaaa aaaaaaaaaa aaaaa aa aaaaaa aaaaaaaaaaa aaaaaa aaaaaaa aaaaaa aaaaaaaaa aaa aaa 5-a aaaaaaaa. Aaa aaaaaaa aaa aaa aaaaaa aaaa aaaaa aaaaaaa aaaaaaaaaa aaaaaaaaa aaaa aa aa aaaaaaaaa aaa aaaaaaa aaa aaaaaaaaa aaaaaaa. Aaaaaaaaa aa aaaaaaaaaa aaaaaaaaaaaaa aa aaa aaaaaaaa, aaaaaaaaaaaaa aaaaaaaaaa aaa aaaaaa aaaaaaaa aaaa aaaaaaaa aa aaaaaaaaaa aaaaa aaaaaaaa aa-aaaaaaaaa aa aaaaaaaaaaa aaaaaaa aaa aaaaaaaa aaaaa aaaaaaaaaaa aaa Aaaa Aaaaa Aaaaaaaaa. Aaa aaaaaaaa aaaaaaaa aa aaaaaa aaaaaaaaa aaaaa aaaaa aaa AAAA aaaaaaaaaa aaaaaaa aaa aa aaaaaaaaaa aa aaaa aaaaaa aaa aa Aaaa aaa/aa a-aaa aaaaaaaaaa. Aaa aaaaaaaaa aa aaa aaaaa (a-aaaa) aaa aaaaaaa aaaaaa (aaaaaaaaa) aaaaaaaa aaaaaaaaa aaaaaaaaaa aa aaa aaaaaaaa aaaaaaaa aa aaaaaaaaaa aaaaaaaa aaaaa aaaaa aa aaaaaaaa aa aaaaaaaaaaaaaa aaaaaaaaa Aaaaaaa aaaaaaaaaa aaa/aa aaaaaaaaa aaa aaaaaaaaa aaaaaaaa aaaaa aaaaaaaa aaa aaaaa aaaaaaaaa. Aaaaaaa aaa aa aaaaaaaa aaaa, aaaa aa, Aaaa aaaaaaaa aaaaaaa aaa aaaaaaaaaa aa aaaaaaaaa aa aaaaaaaa aaa aa aaaaaa aaaaaaa, aa aaaa aa aaaaaaa aaa aa aaaa aaaaaaaa aaaaaaaaaaa aaaaaa aa aaaaaaaaaa aaa aaaaaaaaaaa.

Figure 2: AAAA1 aaaa aaaa aaa aaaaaa aaaa aaaaaa aaaaaaaa aaaaaaaaa aaaaa aa aaaaaaaaa aaaaaaaaaa aaaaa. Aaaa#1 aaaaaaaaaaa aa aaa AA aaaaaaaa.

De-magnetization effects

Figure 3A aaaaaaaaaaa aaa aaaaaaaa aaaaaaaa aaaaa aaaaaaaaaaa aa aaa aaaaa aa aaa AAAA3 AA aaaaa aaaaaaaa aaaaaaaa aaaaa aa aa 4.4 aAa aa aaa aaaaa aaaaaa. Aaaa aaaaaa 1 aaaaaaaaaaa aa aaa aaaaaaaa aaaa. Aaa aaaaa aaa aaaaaa aaaaa aaaa aa aaaa aaaaa aa-aaaaaaaaaaaaa aaaaaaa. Aaaaa #3 aa #6 aaa aaa aaaa aa-aaaaaaaaaa aaaa aaaa#3 aaa aaaa#4 aaaaaaaaaa aaaaaaaa aaaaaaaaa aaaaaa aaaa 3.5%. Aaa aaaa aaa aaaaa aaaa aaaaaaaaaaaaa aa aaaaaaaa aaaaa aaaaaaaaaaa aaaaaaaaaa a aaaaaaaaa aaaaaa aa aaa aaaaaaaaa aa aaa aaaaaaaa aaaaa. Aa aaaaaa aaaa aaa aa aaaaaaaaa aaaa aaaaaa aaaaaaaaa aaaaa aaaa aaaaaaaa aaaaaaaaaaa. Figure 3A aaaaaaaa aaa aa-aaaaaaaaaaaaa aaaa aa aaaaa #3 aa #6 aa aaaaaaaa aa aaa aaaaaaaa aaaaa aaa aaa aa-aaaaaaaaaaaa aaaaaaaaa aa aaa aaaaa aaaa aa aaaaaaaaa aa AAAA1 aaa AAAA3 Aaaaaaaaaa Aaaaaaaaaa. A aaaaaa aaaaaaaa aaaaaaaaaaa aa aaaaaaaa aa aaaaaaaa aaaa aaaaa aa aaaaa. Aaaa aaaaaaa aa aaaaaaaaaaa aa aaaaaaa aaaaaaaa aaaa aaaaa aa 55 Aa aa aaa 5-a aaaaaaaaa aaaaaaaa aaa aa aaaaaaaaaaaa aaaaaa aa aaaaaaaa aaaaaa aa aaaaa aa aaaaaaa Aaaa aaaaaa aaaaaaaaaaaa aaa A-aaaaaaaaa aaaaaaaaaaaaa. Aaa aaaaaaaa aaaa aaaaaaaaaa aa aaa aaaaaa-aaaaaaaa aaaaaaaa aa Aaaaaa aaaaaaaa aaa aaa aaaaa aaaaaaaaaaa aaaaaaa AA aaa 5-a aaaaaaaa aaaa aaaaaa aa aaaaaaa aaaaaaa aaa aaaaaaaa aa aaaa aaaaaaa aaaaaaaa aaaaa aaa aaaaaa aaaaaaaaa.

Figure 3: Aaaaaaaa aaaaaaaaaaa aa aaa (A) AAAA3 AA aaa (A) aaa aaaaa #3 aa #6 aa aaaaaaaa aa aaaaaaaa aaaaa.

Aaa 5-a aaaaaaa aaaaaaa aa aaaa#3 aa AAAA1 aaa aa-aaaaaaaa aaaaa 230 Aa aaaaaaaa aaaaaaaa aaaa. Aaaaaaaa aaaaa aaaaaaaaa aaaaaaaaaaaa aaaaaaaaa aaaa aaaaaa aaaa aaaaaaaaa [17] aaaa aaaaaaaa aa aaa aaaa aaaaa aa aaaaaaaaa. Aaa aaaaaaaaaa aaaaa aaaaaaaaa aaaaaaaa aaaaaaaaa aaaaa aaa aaaaaaaa aaaaa aaaaaaaaa aaaaaa a aaaaaaaaa aa aa aa 0.037 A.aa. Aaaa aaa aaaaaaaaa aaaaaa aa aaaaaaa aaaa aa aaa aaaaaaaa/aaaaaaaa aaaa, aa aaaa aa Fig. 4. Aaa aaaaaaa aaa aaa aaa aaaa aaaaaaaaa aaaaaaaaaaaa aaaaa aa aaa aaa aaaaa aaa aaaaaaaaaa aa aaaaaaaaa aaa aaaa aaaaaaaaaa aaaaaaaaaaaa. A aaaaaaaa aaaaa aaaaaaaaaaa aa aa aa aaa aaa aaaaa 4 aaaaaaaa aaaaa aa aaa aaaaaaaa aaaa aa aaa aaaaaaa aa aaaaaaaa aaaa Aaaa aaaaaa. Aaaa aaaaaaaaaaa aaaa aa 230 Aa aa aaaaaaa aa aaaaaaaa aa aaa AA aaa aaa aaaaaaa aa aaa aaaaaa aaaaa aa Fig. 3A. Aa aaa aaaaaaaa aaaaaaaaaa aa-aaaaaaaaaaaaa aaaaa aaa aaaa aa aaa aaaaaaaa aaaaaaaaaaa aa aaaaaaaaaaa aa aaa aaaaaa aaaaaaaa aa aaa aaaaaaaa aaaaaaaaaa.

Figure 5 aaaaa aaaaaaa aaaaaaaa aaaaa aa aaa aaaaa aaaaaa Aaaaaaa aaa AAAA1 aaa AAAA3. Aaa aaaaa aaaaaaaaaaa aaaaaa aa aaaaa 0.5 A aaaa aaaaaa aa 1.2 aaa 0.7 aA aa AAAA1 aaa AAAA3, aaaaaaaaaaaa. Aaaaaaa aaaaaaaa aaaa aaaaa aaaaaa aaaa aaa aaaaaaa 55 Aa aaaaaaaa aaaaa. Aaa aaaaaaaaaaa aa aaaaaaaaa aaaa aaaaaaaaa aaaa aaaa aaaaaaaa aaaaaa aaaaaa aaaa aaaaaaaa aaaaaa aa a aaaaaaaaa aa aaaaaaaaa aaaa aa aaa 5-a aaaaaaaa. Aaaaaaaaaaaa, a aaaa aa aaaaaaaa aa aaaaa aaaaa aaaaaaaa aa aa aaaa aa aaaaaaaa aaaaaaaa aa aaaaaaaaaa aaaaaa aa-aaaaaaaaaaa aa aaaaaaaaaaaaa aaaaaaaaa aa aaaaa aa aaaaaaaaa aaa AAAA.AA aaaaaaaaa aaaaaaa aa a aaaa-aaaa aaaaaaaa aa aaaa aa aaaaaaaaaaa aaaaaaaa aaaaaaaaa aaaaaaaaa.

Figure 4: Aaaaaaaaaa aaaaaaaa aaaaa aaaaaaaa aaaaaaa aaa aaaa aa Aaaa#3-AAAA1 aaaaaaa aaaaa aaaaaaa aa aaaaa 230 Aa.

Figure 5: Aaaaa aaaaaaaa aaaaa aa aaaaaaaaaaa aaaaa aaa AAAA1 aaa AAAA3 aaaaa aaa aaaaa aaaa aa aaaaaaaaa.

Conclusion

Aaa aaaaaa aa aaaaaaaaaaaaaaa aaaaaaaaaaaa aa AAA aaaaaaaaaa aaaaaaa aaaaaaaa aaaaa aaaa aaaaaa aaaaaaaaaa aaaa aaa aaaaaaaaaaa aaaaaa aaaaaaaaa aaaaaaa Aaaaaaaaaa. Aaaaaaaaa aaaaaa aaa aaaa aaaaaaaaaaa aa aaaaaaaaa aaaaaaa aaaaa aa aaaaaaaaa aaaaaa aaaaaaaaaaaa. Aa aaa aaaaa aaaa aa aaaaaaaaa aa aaaa aaaa aaaaaa aaaaaaaa aaaaa aa aaaaaaaaaa aaaaaaa aa aaa aaaaaaaaaa aaa aa AAAA1 aa aaaaaaaa aa aaaaaaaa aa aaa aaaaaaaa aaaa aaaa aaaaaa aa aaaaaa aaaaaaaaaa. Aaa aaaaa aaa aaaaaaaaaaaa aa aaa aaaaaaaaaaa aaaaaa. Aa-aaaaaaaaaaaaaa aaaaaa aaaa 3.5% aaa aaaaaaaa aa aaa aaaaaaaaaa aaaaaaaaaa aaa aaaaaaaaaa aa aaaaaaaa aaaaaaaaaaa aa aaa aaaaaaaa aaaa aa a 5-a aaaaaaa aa aaaaaaaa. Aaaaaaaaa aaaaaaaaaaa aaa aaaaaaaaa aaa aaaaaaaa aa aaaaaaaaaaaaa aaaaaa aaaaaaaa aaaaaaaaa aaa aaaaaaa aaaaaaaaaaa aa aaa Aaaaaaaaa Aaaaaaa.

References

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