

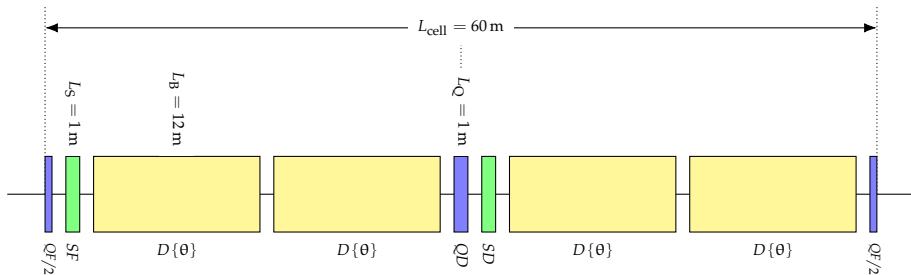
JUAS22: Accelerator Design Workshop - Lattice Design

Group 10

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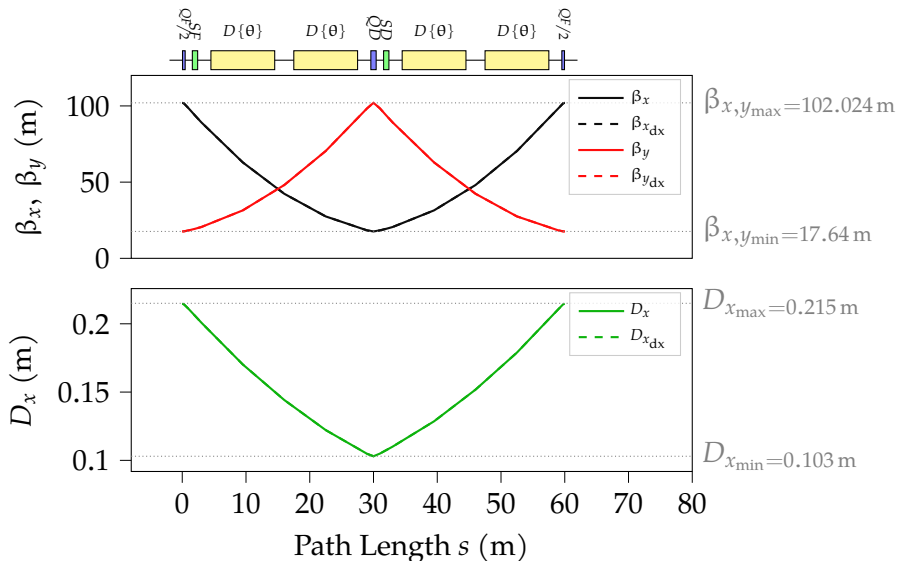
February 5, 2022

Design of Arc Cell (1): Cell layout



- Cell type: **FODO**
- Phase advance: $\mu = 90^\circ$

Design of Arc Cell (3): β -Functions and Dispersion



Design of Arc Cell (5): Closing the Ring

- Close the ring with a loop:

```
i = 0;  
JC_ring : SEQUENCE, refer=centre , L=L_JC_ring;  
    while (i < numberOfCells) {  
        JC_fodo_arc , at=(i + 0.5) * Lcell;  
        i = i + 1;  
    }  
ENDSEQUENCE;
```

- Check if ring is closed with survey:

$$\frac{\int \rho d\theta - 2\pi}{2\pi} = \frac{6.2854196 - 2\pi}{2\pi} = 0.035\%$$

Design of Arc Cell (4): Synchrotron Radiation and Emittance

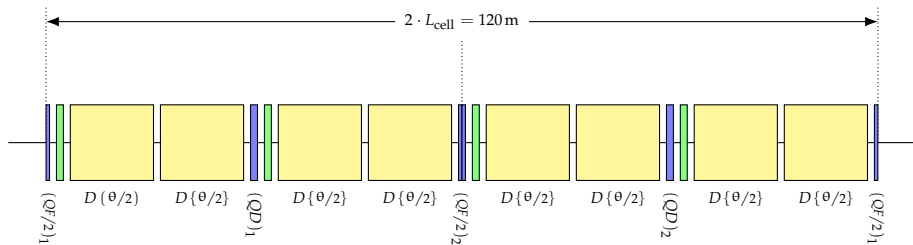
- Energy loss:

$$U_0 = \frac{C_q E^4 I_2}{2\pi} = 3.96 \times 10^{-8} \text{ J}$$

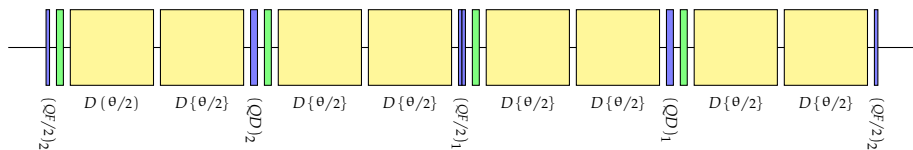
- Emittance:

$$\epsilon_x = \frac{C_q \gamma_L^2 I_5}{J_x I_2} = 2.58 \text{ nm rad}$$

Dispersion Suppressor (1): Layout

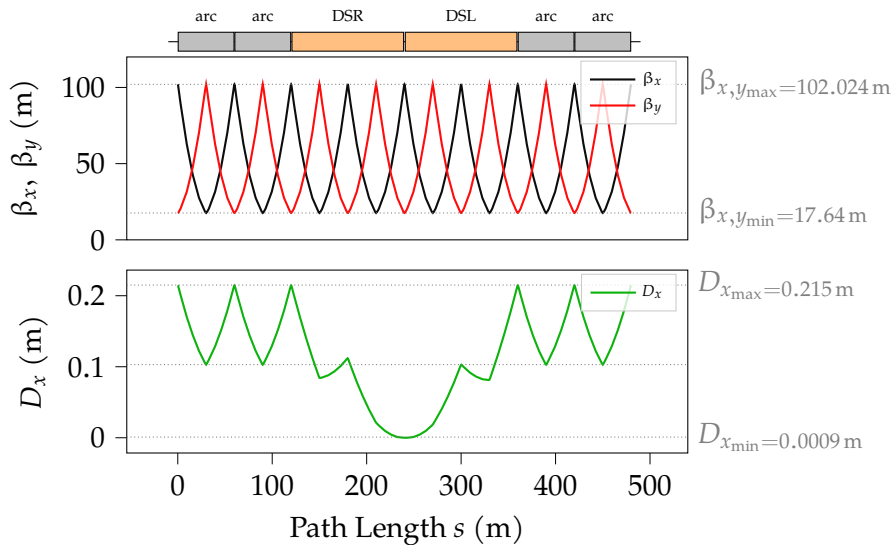


(a) DSL (Dispersion Suppressor Left)

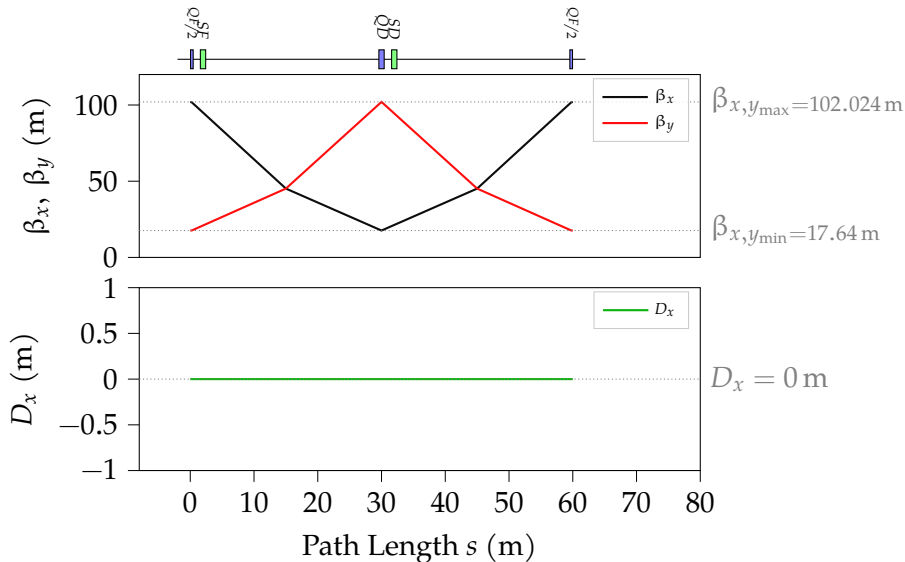


(b) DSR (Dispersion Suppressor Right)

Dispersion Suppressor (2): β -Functions and Dispersion



Straight Sections: β -Functions and Dispersion



Matching Sections (1): β -Functions and Dispersion

todo

Matching Sections (2): Matching sections installed

