

The background is a gradient from dark purple at the top to deep blue at the bottom, speckled with white dots resembling stars. Overlaid on this are several faint, white, circular and semi-circular patterns. Some of these patterns have tick marks and numbers, similar to a circular scale or a clock face. The numbers visible include 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, and 260. There are also curved arrows indicating a direction of movement or flow.

POPLAR FUTURE BEAMLINE

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POPLAR COLLABORATION MEETING

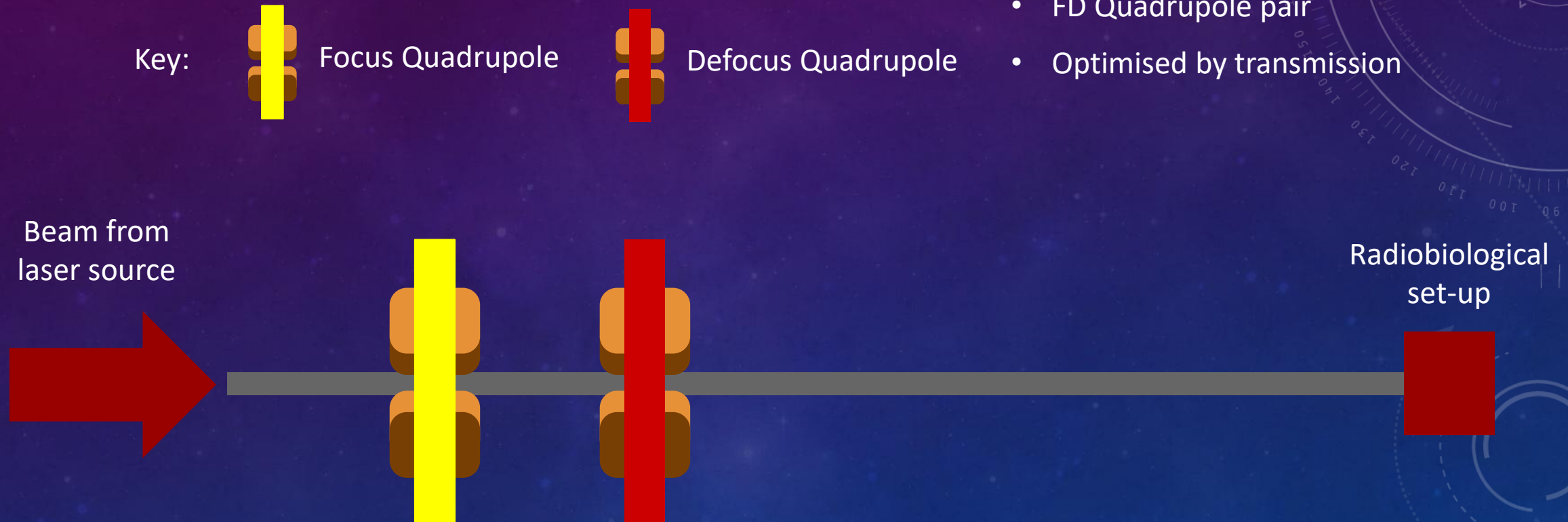


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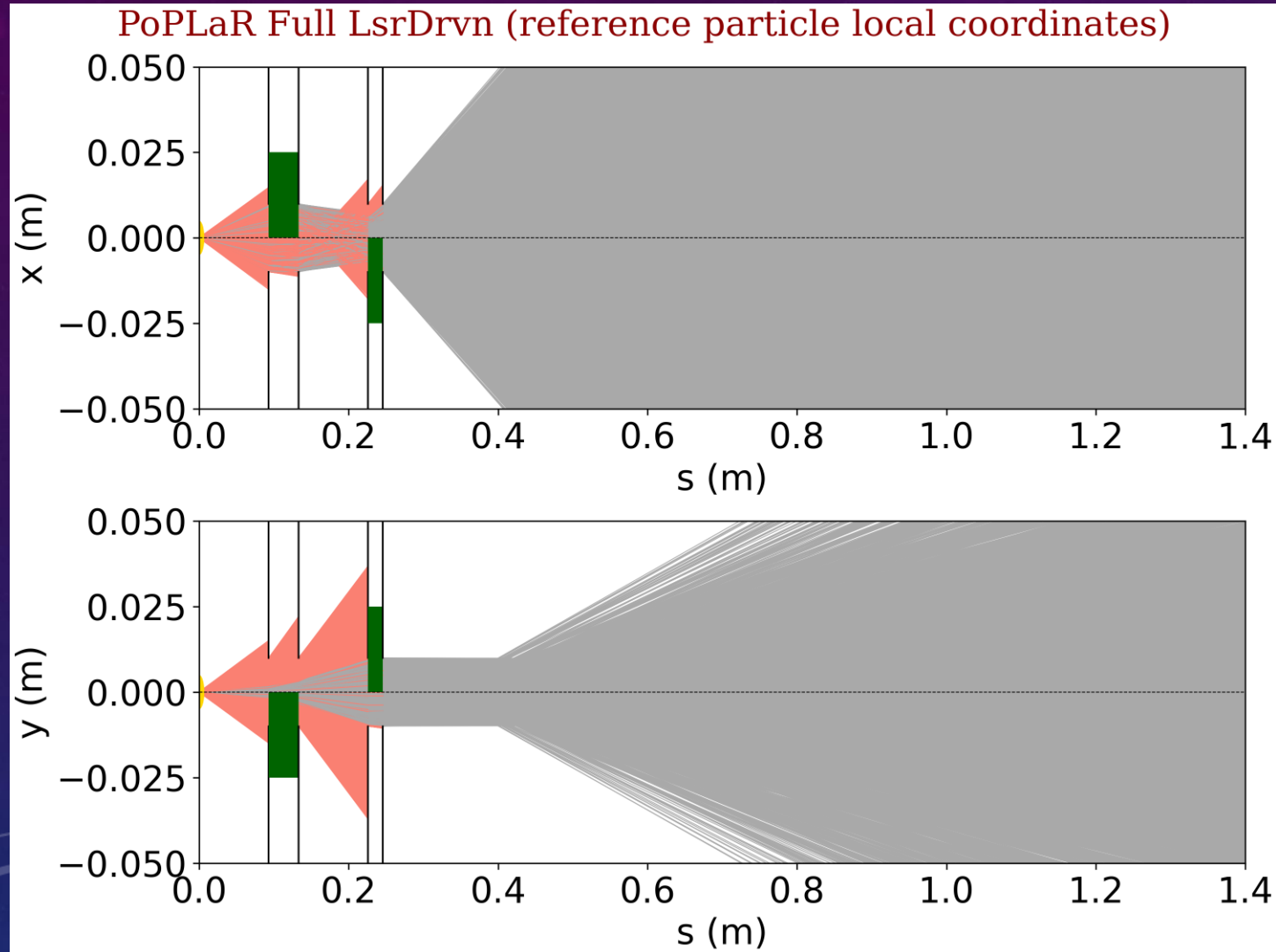
RESULTS SO FAR

CURRENT SET UP- OPTIMISATION

- 2 Quadrupoles
- FD Quadrupole pair
- Optimised by transmission



CURRENT SET UP- VISUAL



- 2 Quadrupoles
- FD Quadrupole pair
- Optimised by transmission

TRANSMISSION TO CELLS: $4.7 \pm 0.07 \%$

ADDITIONAL METRICS

Coefficient of Variation (CV)

- Measures spread of radial fluence distribution

$$\frac{\sigma_{\phi}}{\langle \phi \rangle} \cdot 100 \%$$

Where: σ_{ϕ} = sample std dev across populated bins
 $\langle \phi \rangle$ = mean fluence across populated bins

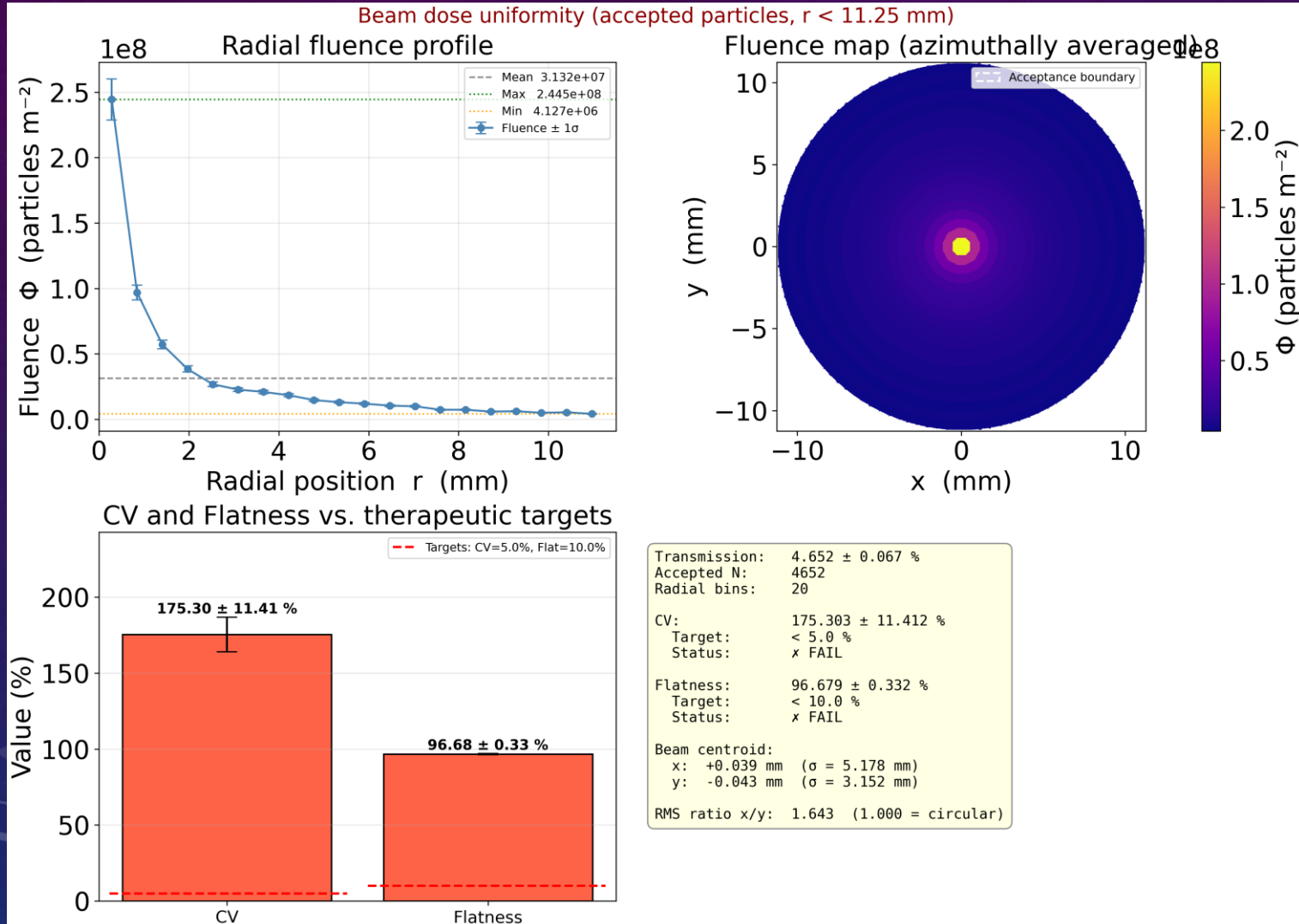
Flatness

- Measures how flat the radial fluence profile is

$$\frac{\phi_{max} - \phi_{min}}{\phi_{max} + \phi_{min}} \cdot 100 \%$$

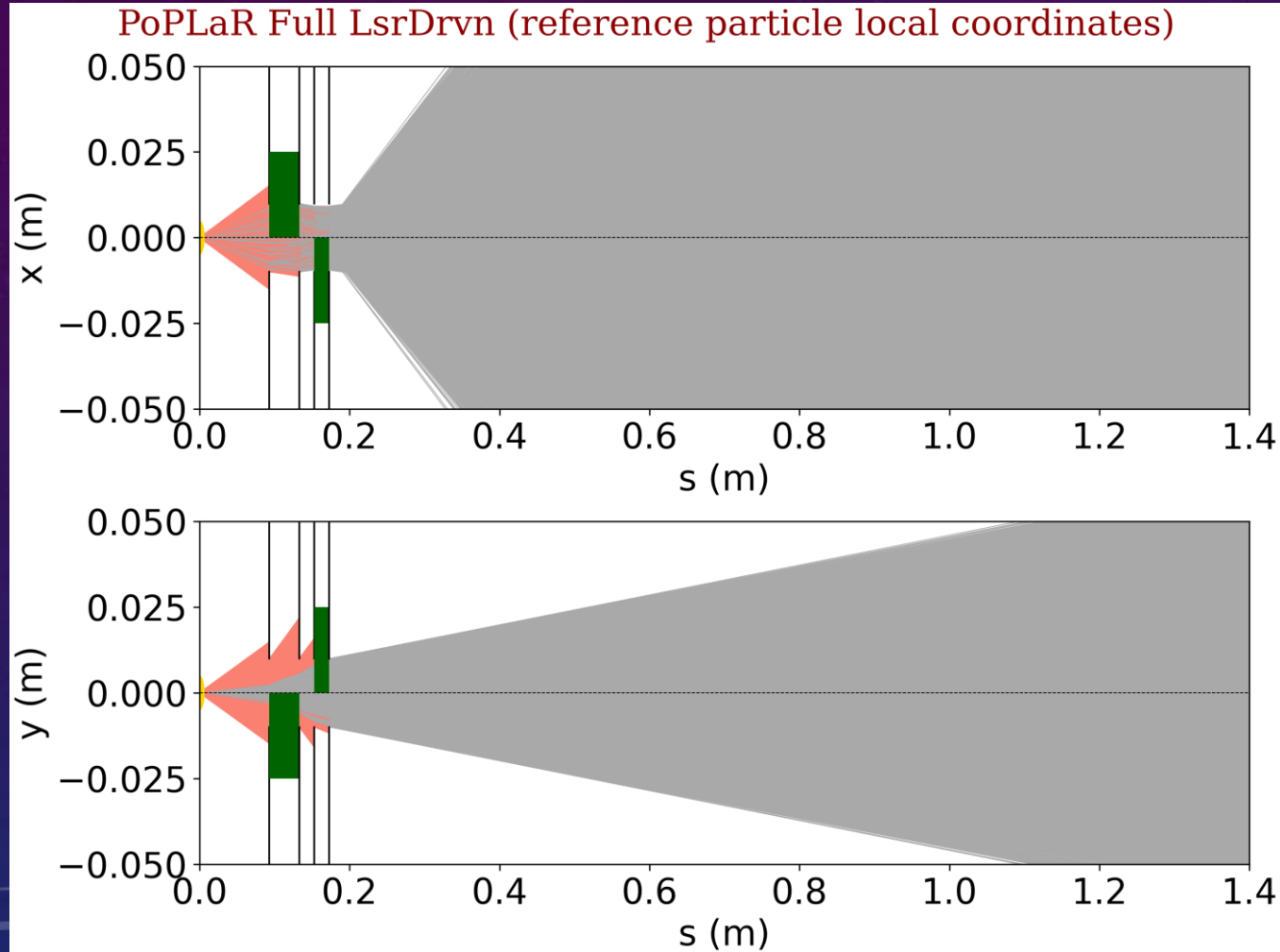
Where: ϕ_{max} = maximum annular fluence
 ϕ_{min} = minimum annular fluence

CURRENT SET UP- CV & FLATNESS ESTIMATIONS



- 2 Quadrupoles
- FD Quadrupole pair
- Optimised by transmission

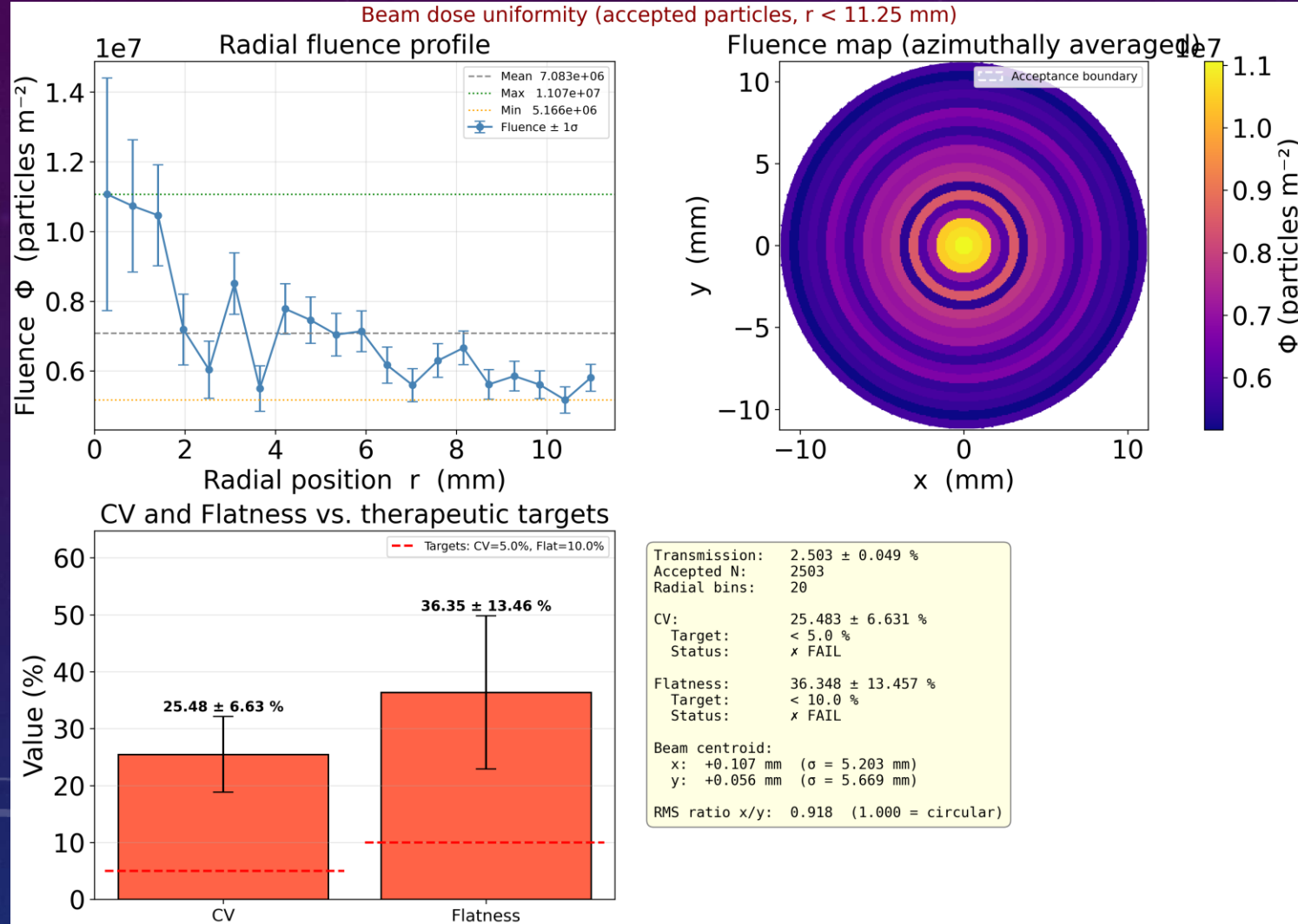
2 QUAD- IF CAN CLOSE Q2 DISTANCE- VISUAL



- 2 Quadrupoles
- FD Quadrupole pair
- Optimised by transmission

TRANSMISSION TO CELLS: $2.50 \pm 0.05 \%$

2 QUAD- IF CAN CLOSE Q2 DISTANCE- CV & FLATNESS ESTIMATIONS

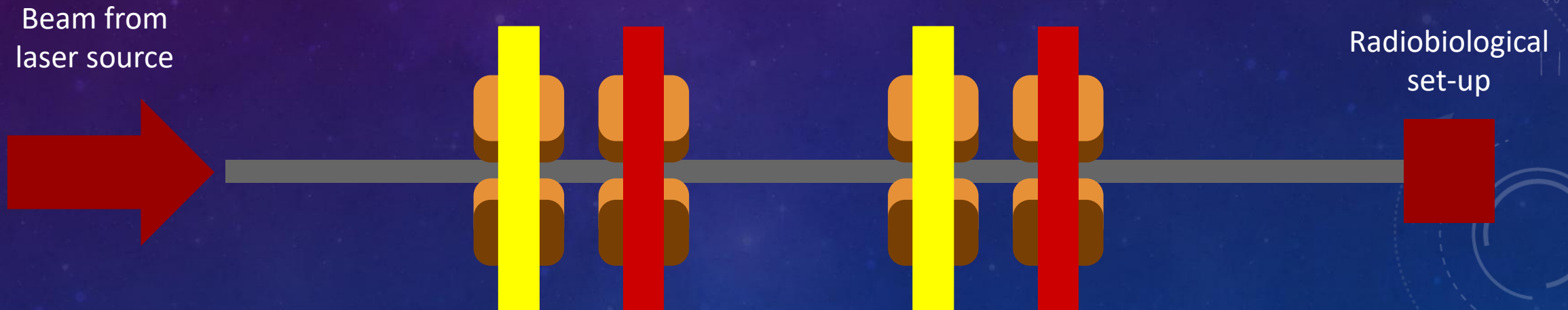


- 2 Quadrupoles
- FD Quadrupole pair
- Optimised by transmission

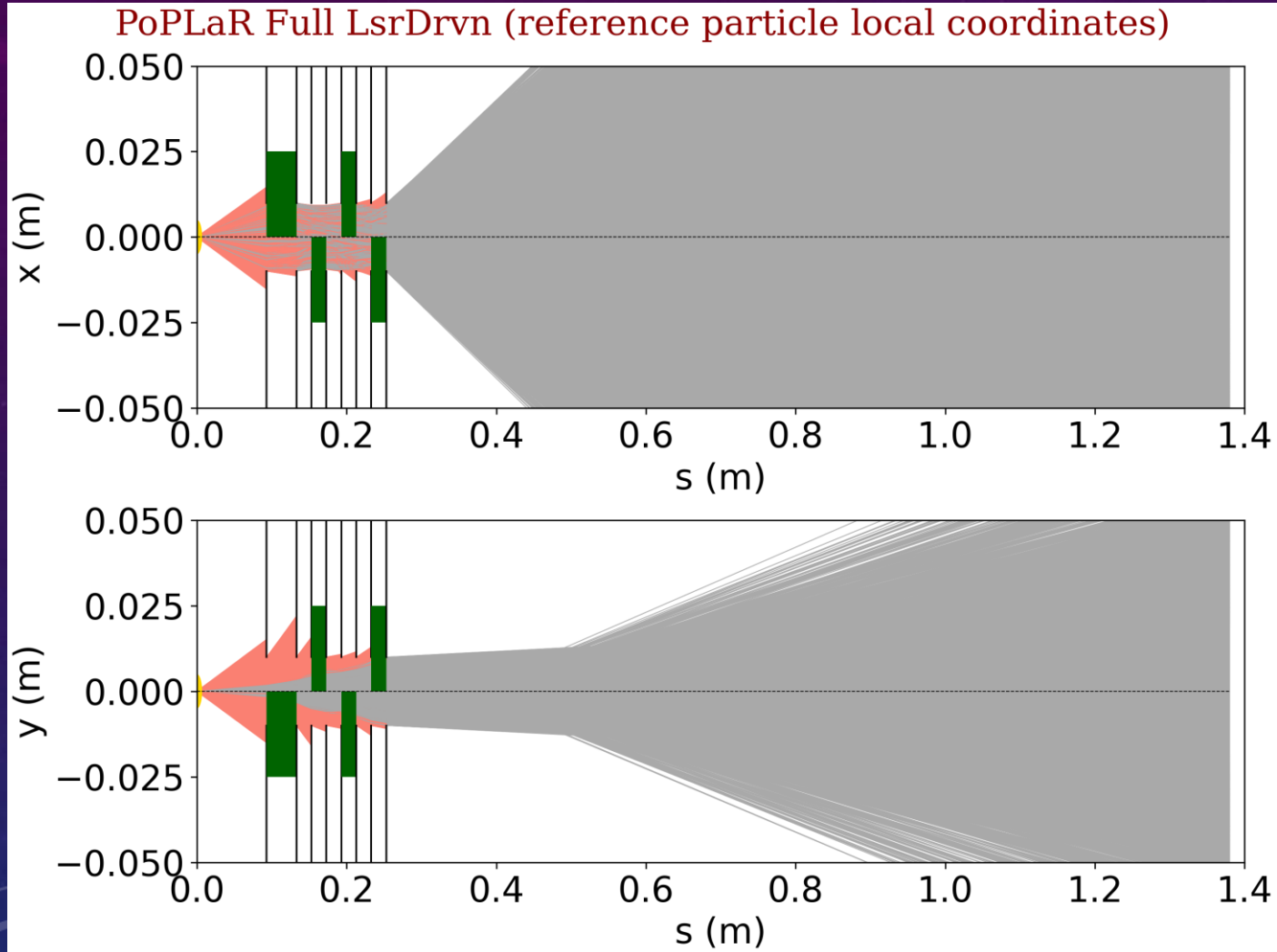
4 QUAD SET UP- OPTIMISATION



- 4 Quadrupoles
- FDFD 2 Quadrupole pairs
- Optimised by transmission
 - First pass: trials all quad options
 - Second pass: optimises for best quad combo



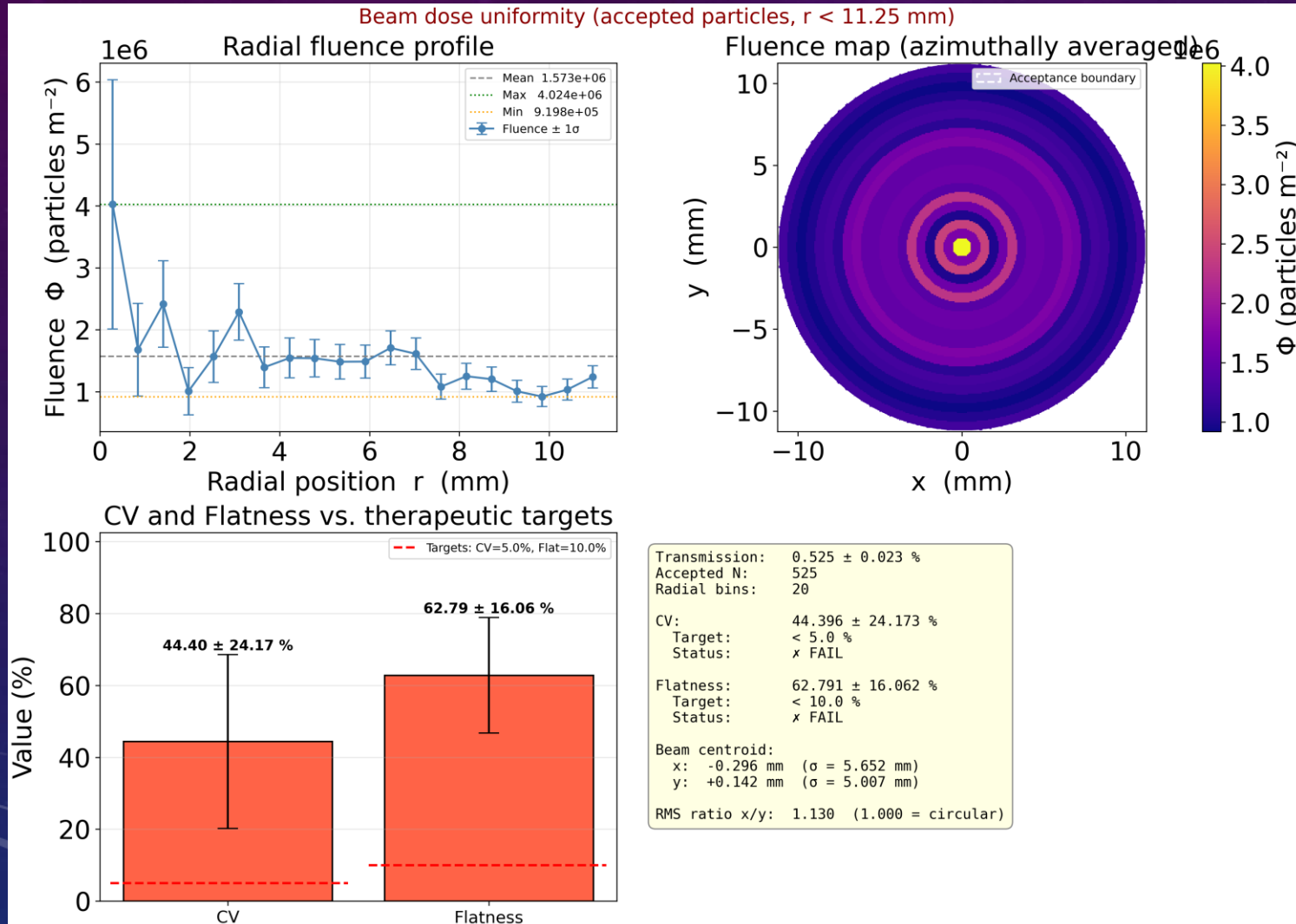
4 QUAD SET UP- VISUAL



- 4 Quadrupoles
- FDFD 2 Quadrupole pairs
- Optimised by Transmission

TRANSMISSION TO CELLS: $4.40 \pm 0.01 \%$

4 QUAD SET UP- CV & FLATNESS ESTIMATIONS

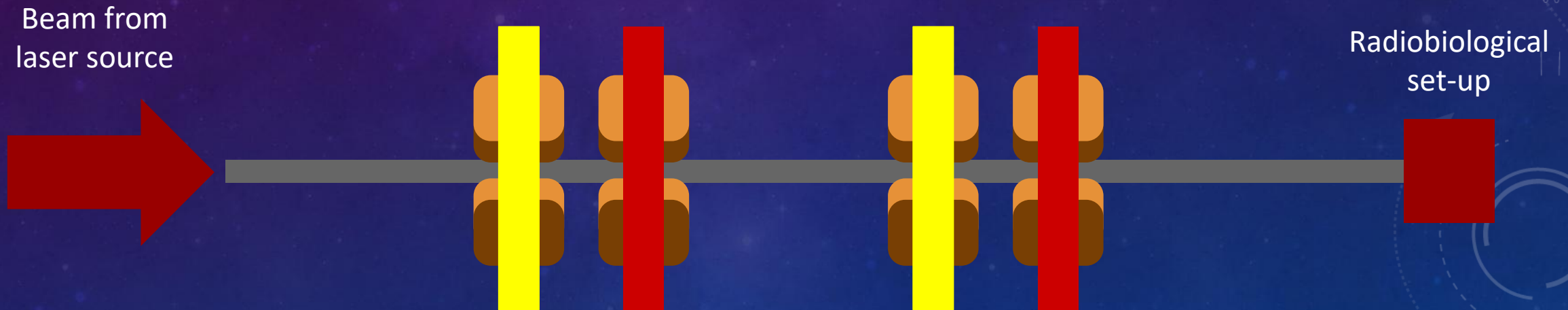


- 4 Quadrupoles
- FDFD 2 Quadrupole pairs
- Optimised by transmission

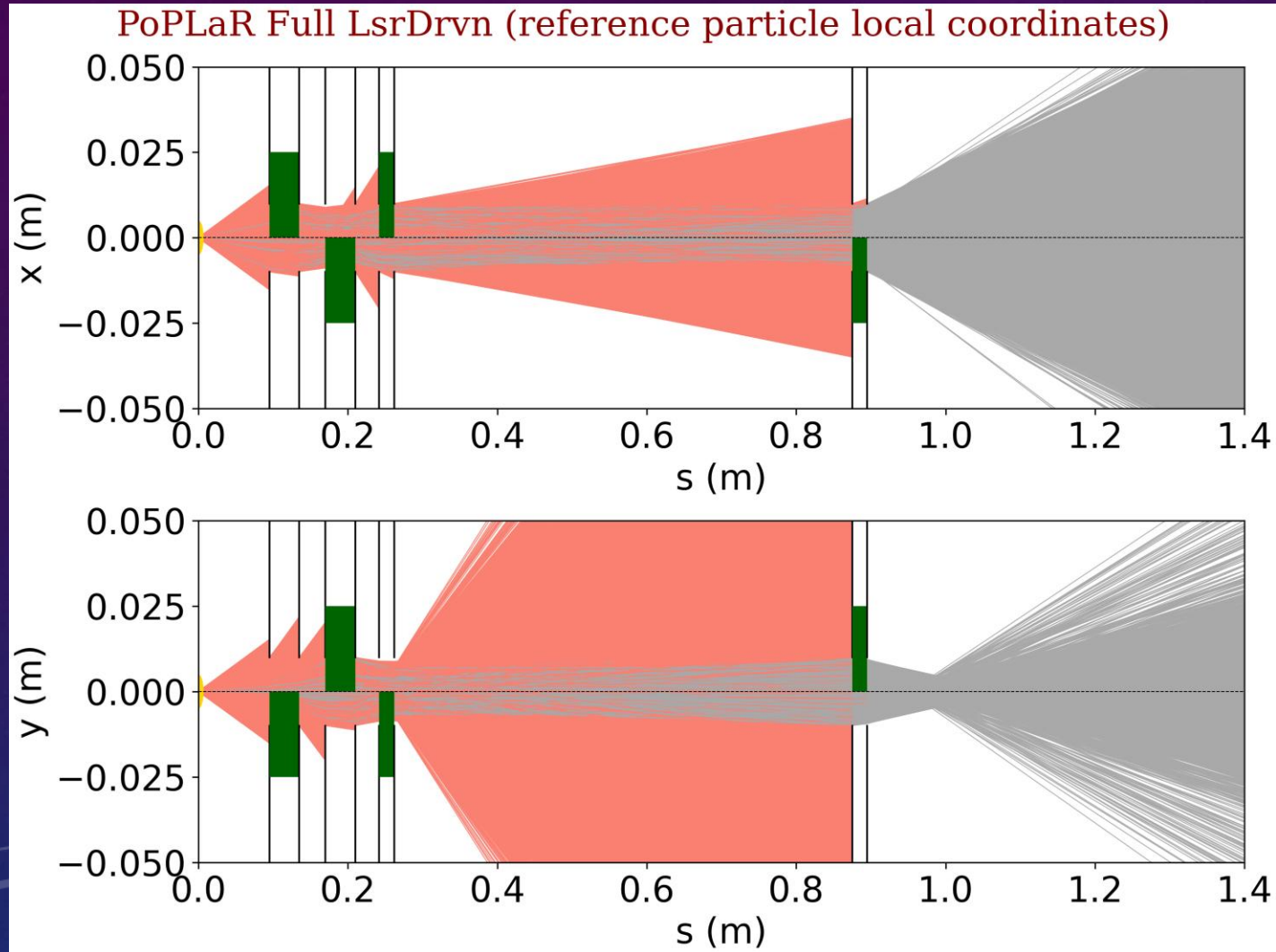
4 QUAD SET UP- OPTIMISATION



- 4 Quadrupoles
- FDFD 2 Quadrupole pairs
- Optimised by CV
 - First pass: trials all quad options
 - Second pass: optimises for best quad combo



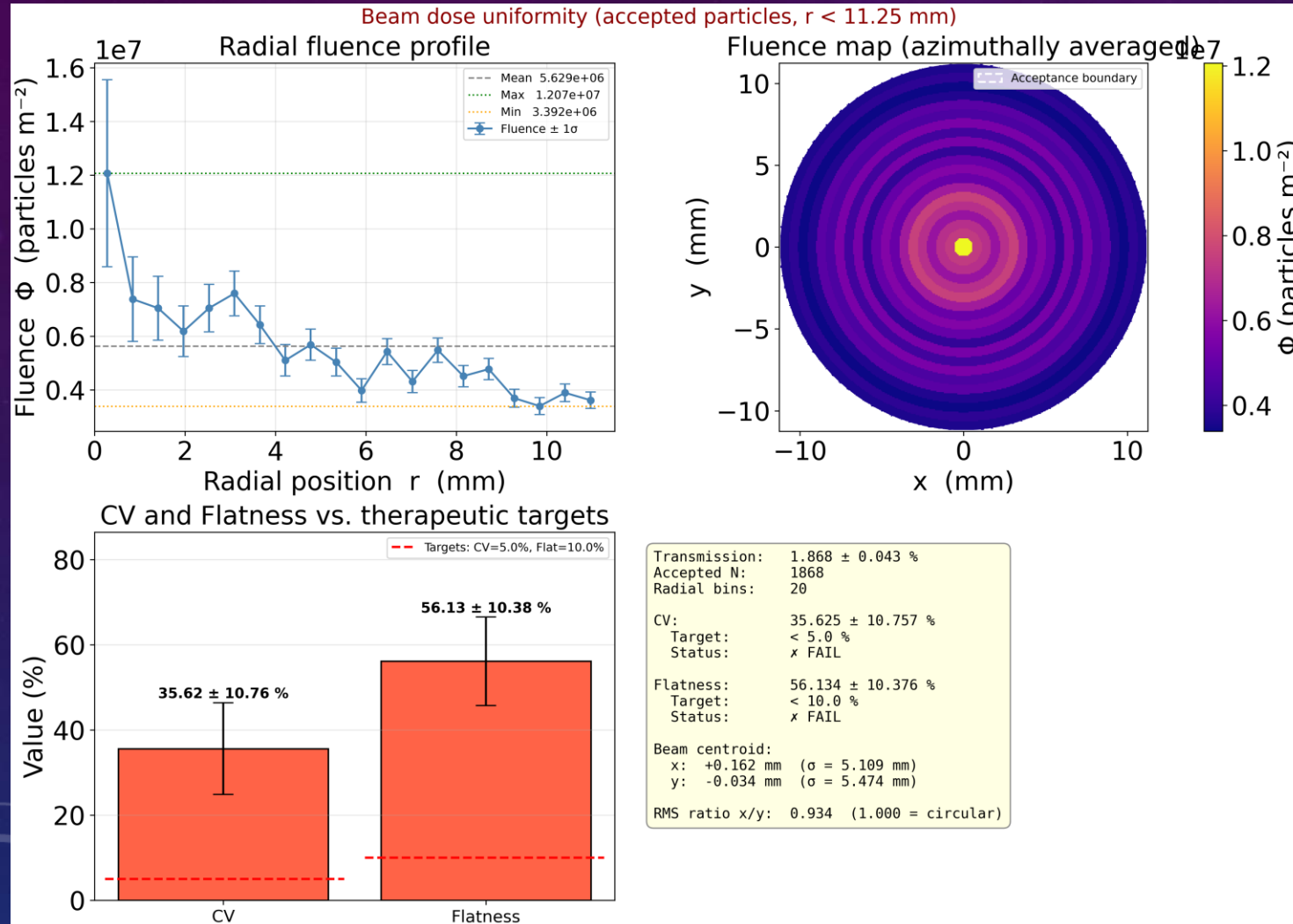
4 QUAD SET UP- VISUAL



- 4 Quadrupoles
- FDFD 2 Quadrupole pairs
- Optimised by CV
- Low transmission penalty in cost function

TRANSMISSION TO CELLS: 1.87 ± 0.04 %

4 QUAD SET UP- CV & FLATNESS ESTIMATIONS



- 4 Quadrupoles
- FDFD 2 Quadrupole pairs
- Optimised by CV
- Low transmission penalty in cost function

The background is a gradient from dark purple to deep blue, overlaid with a pattern of small white stars. Faint, light-blue technical diagrams are visible, including a large circular scale on the right with degree markings from 0 to 210, and several smaller circular elements with arrows indicating motion or flow.

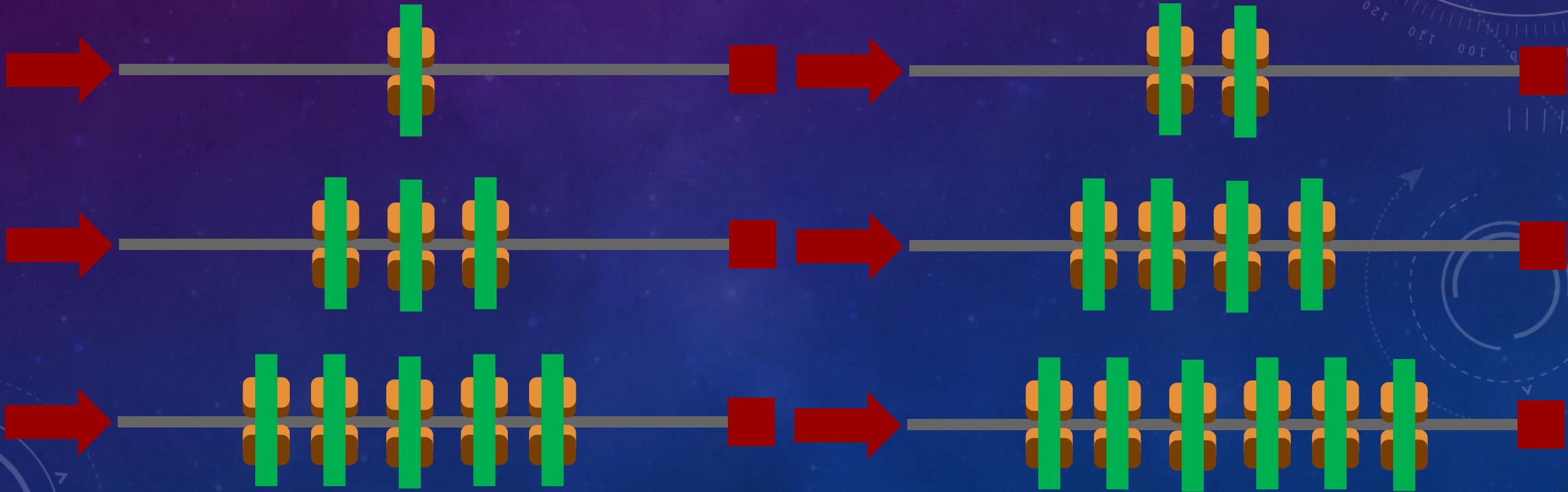
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PENDING RESULTS

ANY QUAD SET UP- OPTIMISATION




Key:  F or D Quadrupole

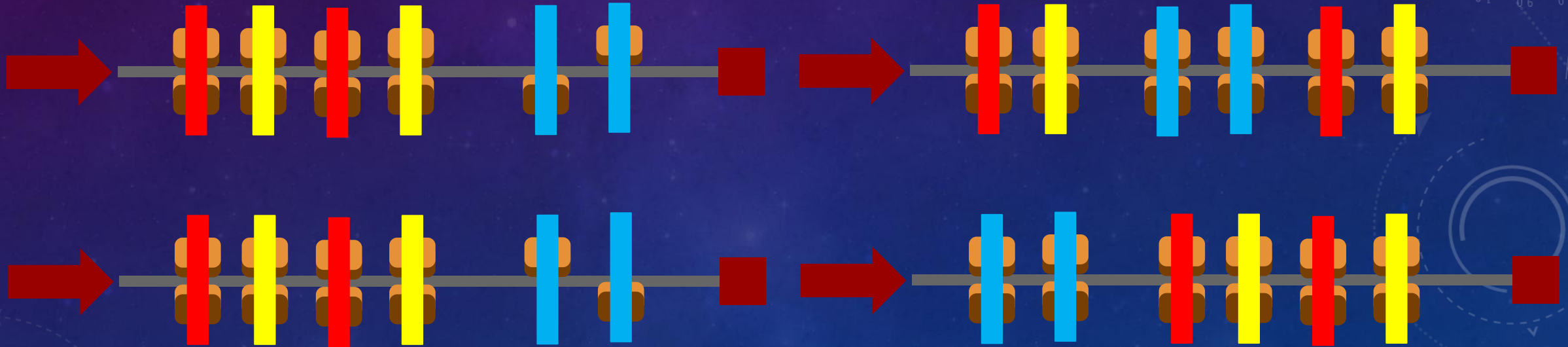
- Can have between 1 and 6 Quadrupoles
- All FD orders investigated
- Optimised by Transmission
- Optimised by CV



4 QUAD 2 DIPOLE SET UP- VISUAL

Key:  Focus Quadrupole  Defocus Quadrupole

 -/+ dipole pair
 +/- dipole pair
 Non-specific dipole pair



The background is a gradient from dark purple to deep blue, overlaid with a pattern of small white stars. Faint, light-blue technical diagrams are visible, including a circular scale with degree markings (90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210) and arrows in the top right, and concentric circles with arrows in the bottom right and bottom left.

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SLIGHTLY UNHINGED OPTION

ANY QUAD & DIPOLE SET UP- OPTIMISATION

- Can have 1-6 Quadrupoles and dipole pair
- All FD orders investigated
- Optimised by Transmission
- Optimised by CV

