

# Beam Delivery (SOBP)

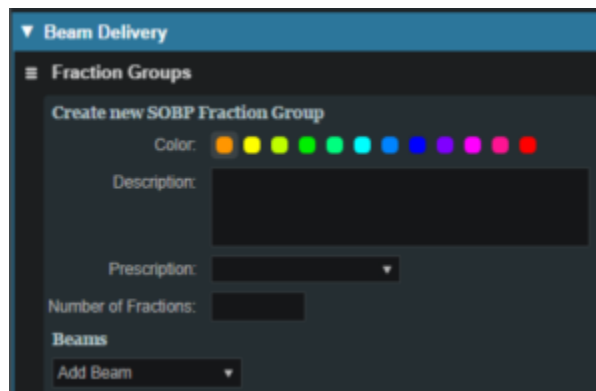
## Fraction Groups

Defining *Fraction Groups* is the first step in the SOBP Optimization process within Astroid. Most commonly, a fraction group is simply an arrangement of beams that will be used in a typical daily treatment fraction. The Fraction Group contains the *Beam Set* where each beam can be weighted and normalized based on the needs of each case. These are key concepts within Astroid that allow for high levels of control over the Astroid SOBP Optimization engine. Further details of these critical items are provided below.

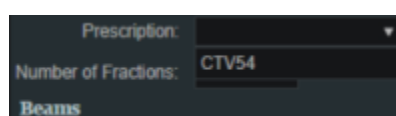
- To get started, navigate to the *Beam Delivery* block and click *Create New Fraction Group*.



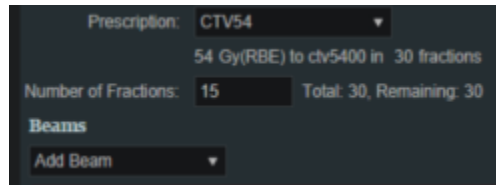
## General Fraction Group Data



- **Color:** Display color of the *Fraction Group*
- **Description:** Optional, user specified text describing the *Fraction Group*
- **Prescription:** Prescription that the *Fraction Group* implements; note that only targets containing dose statements from this Prescription will be available when selecting the Target for the Fraction Group

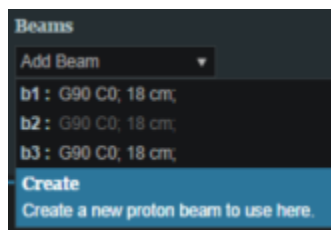


- **Number of Fractions:** The total number of fractions to be delivered for this *Fraction Group*; this is very important as it will determine the appropriate Monitor Units for the individual beams



## Beam Options

- Select the beams to be added to this fraction group from the drop down list. Repeat this process as necessary. Notice how a one the beams in the image below is grayed out. This means that the beam has already been selected or it is a *patch beam*. If it is a patch beam, the beam will automatically be added with its parent beam. There is also the option to create a new beam from the drop-down list.



- Change the normalization factor by clicking its box and entering the value desired.
  - This is independent from the weight values.
  - Available as an option for patch beams
  - Useful when adjusting hot or cold areas where beams treat the same area or meet.
- Weight each beam by either sliding the slider or clicking on the weight value box and type in the value.
  - The value of all beams listed **MUST add up to 1.0** (100%).
  - By default, the beams are automatically weighted evenly, and, if edited, can be reset by clicking the *weight beams evenly* option.
  - Use the *Beam Lock* (not available for patch beams) to restrict a beam from automatically adjusting when another beam's weight is adjusted. This option is useful to secure one beam's weight while adjusting the other beams' weights (see image below). The sum of all weights still must equal zero.

The screenshot shows the 'Beam Delivery' window with the 'Fraction Groups' tab selected. It features a 'Create new SOBP Fraction Group' section with a color picker, a description field, a prescription dropdown set to 'CTV54', and a status line indicating '54 Gy(RBE) to chv5400 in 30 fractions'. Below this, the 'Number of Fractions' is set to 15, with a total of 30 and 15 remaining. The 'Beams' section lists four beams (b1, b2, b3, b4) with their respective parameters and beam weights. Beam b1 has a weight of 0.5, b2 has a weight of 0.2, b3 has a weight of 0.2, and b4 has a weight of 0.3. Each beam has a 'Normalization Factor' of 1. At the bottom, there is an 'Add Beam' button and a 'weight beams evenly' checkbox.

▼ Beam Delivery

≡ Fraction Groups

Create new SOBP Fraction Group

Color: [Color Picker]

Description: [Text Field]

Prescription: CTV54

54 Gy(RBE) to chv5400 in 30 fractions

Number of Fractions: 15 Total: 30, Remaining: 30

Beams

b1 : G90 C0; 18 cm; Normalization Factor: 1

Beam Weight: 0.5

b2 : G90 C0; 18 cm; (patch) Normalization Factor: 1

b3 : G90 C0; 18 cm; Normalization Factor: 1

Beam Weight: 0.2

b4 : G90 C0; 18 cm; Normalization Factor: 1

Beam Weight: 0.3

Add Beam [Dropdown]

weight beams evenly

Done Cancel

- When finished, click the *Done* button. Clicking the *Cancel* button will reset the changes made to the current fraction group and return the *Beam Delivery* block to its previous state.
- Repeat process of adding fraction groups until all remaining fractions are completed.

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