



Creating a Field of Drifting Gabors

In this advanced [Psykinematix](#) tutorial, you will learn how to:

- use the Math palette to visualize a time-varying parameter for each video frame,
- create a drifting Gabor,
- duplicate the drifting Gabor in an uniform field of randomly oriented elements,
- preview the resulting highly dynamic stimulus.

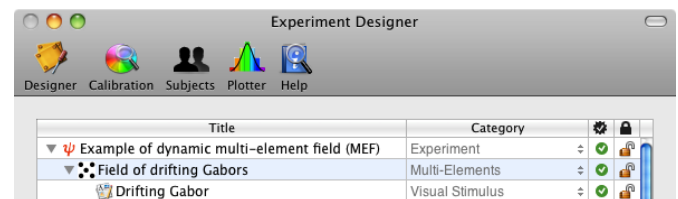
This lesson assumes you have been through lesson 1 of one of the main tutorials ([Visual Acuity](#), [Contrast Sensitivity](#), or [Orientation Discrimination](#)) and became familiar with adding and inspecting the various types of events.

Difficulty: 2/5

Duration: 20 mn

Step 1: Creating the Experiment Hierarchy

First, create the above events hierarchy in the "Experiment Designer" panel (see the "[Contrast Sensitivity: Lesson 1](#)" or "[Orientation Discrimination: Lesson 1](#)" tutorial to learn more about how to create this events hierarchy).

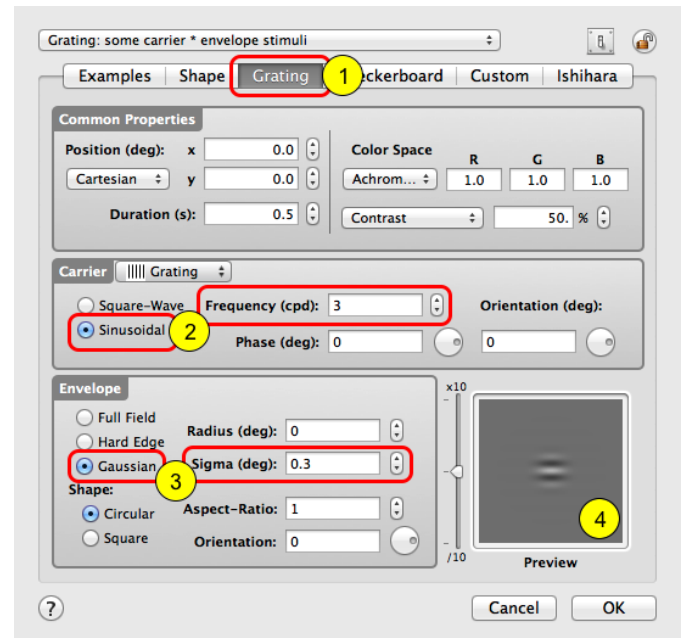


This hierarchy specifies an experiment that simply shows a field of multi-elements composed of drifting Gabors. The events still need to be customized in terms of spatial and temporal properties as detailed in the steps below.



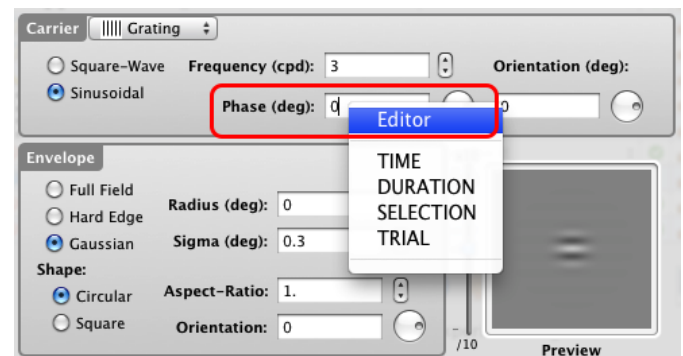
Step 2: Creating a Gabor Stimulus

Select the "Drifting Gabor" event and click on the properties button (or ⌘-i). The panel above will open. Click on the "**Grating**" tab to select the "Grating Stimulus" type (1). From there, you can create a Gabor stimulus by specifying a **Grating carrier** with a **sinusoidal** modulation at a given **spatial frequency** (2), and specifying a **Gaussian envelope** with a given spatial extent "**sigma**" (3). A preview of the specified stimulus is always displayed in the Preview box (4).



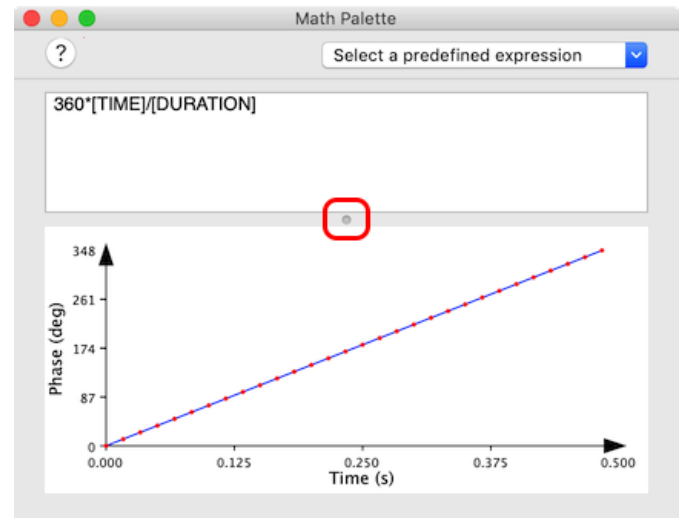
Step 3: Adding a Drifting Motion

The drifting motion of the Gabor can be created by specifying a phase of the sinusoidal carrier that changes linearly over time. To do so you can either edit directly the **phase** text field and enter the following expression: $360 * [TIME] / [DURATION]$, or use the expression editor by control-clicking on the text field and selecting the **Editor** option in the contextual pop-up menu.





If using the editor, enter the same expression ($360 * [TIME] / [DURATION]$) in the text field. The editor automatically detects time-varying expressions and should reveal a graphical representation of the expression. If not, drag the bar (highlighted in red) to unveil the graph. Note that each red dot on the blue line represents the expression value at each video frame of the stimulus presentation.



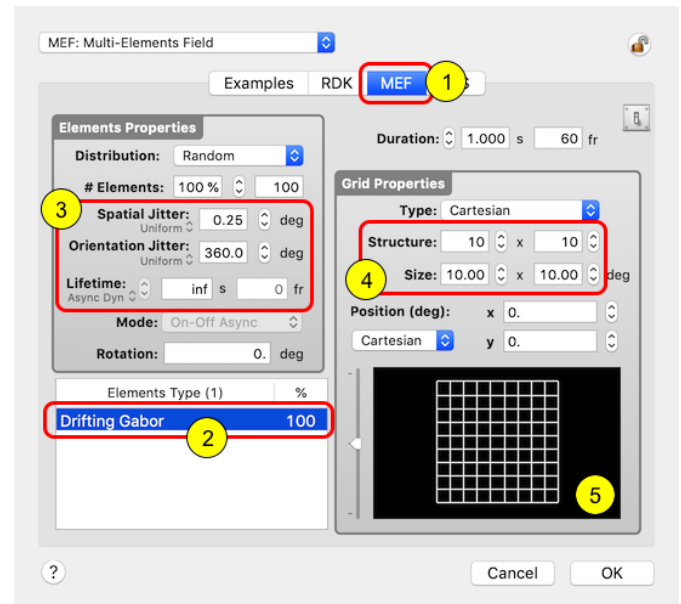
In the above expression, **[TIME]** represents the built-in time variable relative to the stimulus onset, and **[DURATION]** represents the built-in duration variable for the currently edited stimulus. Hence, this expression specifies a spatial phase in degrees starting from 0 at the stimulus onset to 360 at stimulus offset, corresponding to a full cycle shift for the stimulus duration. Note that the built-in variables, **[TIME]** and **[DURATION]**, have to be specified in uppercase because they are system-defined variables.

Click on the "OK" button to validate the change and close the properties panel for the Gabor stimulus.



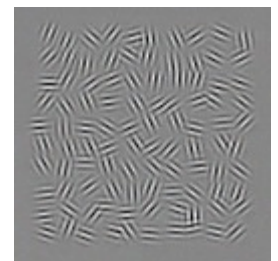
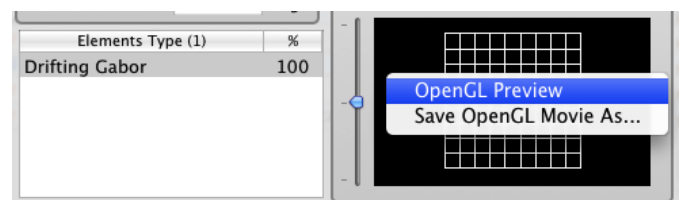
Step 4: Customizing the Multi-Element Field

Select the "Field of drifting Gabors" event and click on the properties button (or ⌘-i). The panel above will open. Click on the **"MEF"** tab to select the "Multi-Elements Field" type (1). From there, you can customize the appearance of the elements field composed of the drifting Gabors: select the "Drifting Gabor" in the table (2), specify the spatial and orientation jitters to apply to each Gabor element in the grid and set their lifetime to infinity (*inf* value), specify the grid in terms of the total number of elements and its overall size. The grid appearance is always displayed in the Preview box (5).



Step 5: Watching the Dynamic Field

You can now either run the experiment, preview the dynamic stimulus, or export it as a movie!



Conclusion

In this tutorial you learned how to create a field of drifting Gabors using the **"Multi-Elements"** panel.

We hope you have enjoyed this tutorial! If you have an idea for another one, let us know!!!