Photon ENGINEERING
Illuminating Ideas

FRED™ New Features

Version 20.01

Summary of New Features

The following new items are included in this release version:

Diffraction Gratings

- A substrate swelling factor has been added to the Volume Hologram diffraction efficiency specification that defines how the substrate expands or contracts after hologram recording.
- A new diffraction grating type, “Two source user-recorded HOE”, has been added in which the beams used to construct the grating phase function are defined by raytracing real rays through recording optics to the grating surface. This specification means that the grating function is completely customizable through the use of real ray data applied during the hologram recording step and can include the effects of aberrations in the grating recording setup.

Raytrace Paths

- The Raytrace Paths table and Stray Light Report dialog now allow ray selection filters to be defined that can be used to quickly identify all paths meeting the ray selection filter requirements. For example, a ray selection filter might be defined with the requirement that the paths must contain a +1 order diffraction event with a grating surface. When the filter is applied, the raytrace paths data will be refreshed to show the number of rays on each path that satisfy that requirement.
- Raypath data saved to a *.FRP output file can now be read back into any FRED document by going to Raytrace > Read Ray Paths from file. Previously, FRP files could only be read by the document that originally created the FRP file. This new capability is considered to be a generic FRP file reader.

Scattering

- The Tabulated BSDF scatter model algorithm has been completely rewritten to provide better interpolation of tabular data. The BSDF plotting functionality related to tabular data and tabular data fitting has been improved.
- The Harvey-Shack and ABg BSDF data fitting utility has been rewritten with a new algorithm and now supports fitting data to the Extended Harvey-Shack function.

Ray Selection Filters

- 20 new ray selection filter criteria have been added relating to ray path and diffraction events. In previous versions of FRED, filtering based on these attributes required the use of FRED's scripting language to programmatically search through the raytrace path database.
- The Advanced Raytrace dialog contains a new Ray Selection Filter capability that can be used to automatically delete or deactivate rays that do not meet the specified ray selection criteria. This can be useful in cases where a large raytrace has been performed but only a small subset of the rays is of actual interest for analysis. By deleting, or deactivating, rays that are not relevant, the speed of post-trace analyses on the ray data can be increased.
- The Ray Summary, Ray Statistics, and Ray-by-Ray Summary features now display a dialog allowing a ray selection filter and output data coordinate system to be designated prior to performing the calculation.