
Introduction

Photon Engineering makes every possible effort to have regular releases which provide significant feature and usability enhancements to FRED. The purpose of this document is to convey the most recent features added to FRED in the last release and describe both their utility and implementation with reference to any examples which demonstrate their use.

New Features

FRED^{MPC} – GPU Raytracing and Analyses

A major new raytracing and analysis capability using GPUs has been added to the program that allows for calculations to be performed orders of magnitude faster than CPUs. Certain calculations, especially those requiring very large total ray counts, can benefit significantly from being run on the GPUs. A FRED^{MPC} license is required to use this new feature. If you are interested in testing the new capability, please contact our Sales team at fredsales@photonengr.com. Additional information regarding the new FRED^{MPC} capability can be found in the Help system under the topic, “FREDmpc (GPU raytracing and analyses)”.

FRED Standard license changes

Standard licenses may now run the 64-bit version of FRED and will use up to 17 threads for multi-threaded CPU raytracing and analyses.

Source Primitives

A new type of source construct, the Source Primitive, has replaced the Simplified Source concept in previous versions of FRED. The 17 new Source Primitives allow for rapid construction of the most commonly requested coherent and incoherent source types using a minimal set of required parameters. Additionally, a set of Source Primitive script commands have been included that facilitate straightforward configuration of a Source Primitive node using the scripting language.

The 17 Source Primitive types are:

<i>Plane Wave (coherent)</i>	<i>M-Squared Laser Beam</i>	<i>Rayfile Source</i>
<i>Point Source (coherent)</i>	<i>Point Source (incoherent)</i>	<i>Random Volume into a Sphere</i>
<i>Laser Beam (00 mode)</i>	<i>Plane Wave (incoherent)</i>	<i>Ray Fan</i>
<i>Astigmatic Gaussian Beam</i>	<i>Lambertian Plane</i>	<i>Solar Source (simple)</i>

<i>Laser Diode Beam (coherent)</i>	<i>Lambertian Surface LED (far-field)</i>	<i>Laser Diode (incoherent) Bitmap</i>
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Encrypted Thin Film Coating

It is now possible to export a Thin Film Layered coating prescription to an encrypted data file. The encrypted file can then be reloaded back into a FRED model as a new Encrypted Thin Film coating type. The intention of this feature is to allow coating vendors to provide accurate thin film coating models for use in FRED raytracing and analyses while simultaneously protecting the coating vendor's IP.

Double click to display ARN in chart

2D analysis results nodes (ARNs) can be displayed in a chart window by double clicking on the ARN in the object tree.

Miscellaneous Updates and Bug Fixes

In addition to the major new improvements described above, this release contains many smaller feature additions and bug fixes. Please refer to the Release Notes found on FRED's Help menu for a complete listing of all enhancements and defect resolutions.