GenerateTemplate

GenerateTemplate[*directory*, *name*, *a*, *θo*, *imageSize*, *maxBardeenCoordinate*, *shellRadius_* : 50, *radiusLimit_* : 0, **Options**]

generates a template containing information about null geodesics specified by (dimensionless) *a*, *θo* (distant observer's *θ*) and maximal Bardeen coordinate that is shown. The number of geodesics to be generated is specified in *imageSize* in the form {xsize, ysize}. The template is saved in directory/name.mx file, which can be used later with `DiskImageFromTemplate`.

`GenerateTemplate`[*directory_*, *name_*, *a_*, *θo_*, *imageSize_*, *maxBardeenCoordinate_*, `OptionsPattern`[]] is a function, which takes the name of the directory, in which a template should be saved, *directory*, a name of the template's file *name*, the dimensionless angular momentum of the black hole *a*, the observer's polar angle *θo*, a list of length two containing the size of the image to be generated from the template in pixels *imageSize*, the maximal Bardeen coordinate *maxBardeenCoordinate*, the optional arguments *shellRadius* (in G=c=M=1 units) which dictates the radius of shell intersection coordinates which are used for generating distorted stellar background using the `StellarBackgroundFromTemplate` function, *radiusLimit*, the greatest radius at which the disk near the black hole should be visible, and an options pattern.

The following options can be given:

`"Rotation"`	`"Counterclockwise"`	Sets the direction of rotation of the black hole. The default option is "Rotation"–> "Counterclockwise". The opposite is "Rotation"–> "Clockwise".
`"PhiRange"`	`{-Pi, Pi}`	Sets the range of output of the azimuthal angle. The default is "PhiRange"–> {–∞, ∞}, which starts the coordinate at 0 and does not take the modulus of it after full windings. Typical options could be {–π, π} or {0, 2π}, but other option values in the format {bottomvalue, topvalue} are valid as well.

Tech Notes

KerrImages

Related Links

XXXX

See Also

KerrNullGeoDistant ▪ **DiskImageFromTemplate** ▪ **DiskImage** ▪ **StellarBackgroundFromTemplate** ▪ ⊕

Related Guides

KerrImages

Examples Initialization

```
Needs["BlackHoleImages`"]
```

Basic Examples

More Examples ▹

Generate a template of a geometry given by the spin parameter *a=0.5* with the observer at θo=0.45 π. Generate 100 x 100 points with maximal Bardeen coordinate 20:

```
In[7]:= GenerateTemplate[Directory[], "template_a0.5_th0.45pi_size100x100_mBC20", 0.5, 0.45 π, {100, 100}, 20]
```

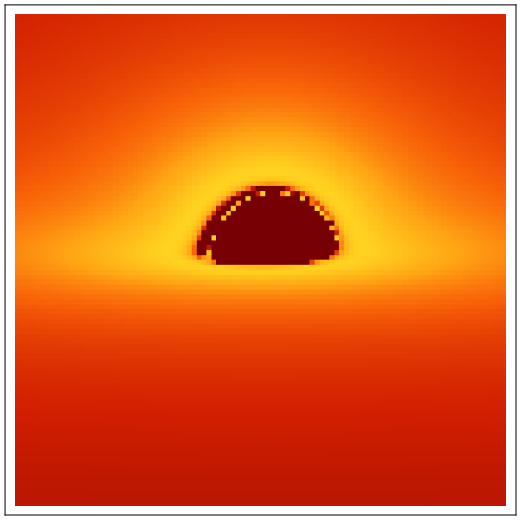
%

From the generated template, generate an image of the disk's physical temperature using the `DiskImageFromTemplate` function. The black hole has a solar mass, the matter influx is 10^14 kg/s and α=0.1:

```
In[10]:= img = DiskImageFromTemplate[Directory[] <> "\\template_a0.5_th0.45pi_size100x100_mBC20.mx",
           0.5, 0.1, 1500, 1, "Grid" -> False, "Output" -> {"PhysicalTemperature"}]
```

```
In[11]:= ArrayPlot[Reverse[img[[1]]], ColorFunction -> "SolarColors"]
```

Out[11]=



More Examples

Metadata

New in: XX | Modified in: | Obsolete in:

Categorization

Keywords

Syntax Templates