DiskImageFromTemplate

DiskImageFromTemplate[*file*, *a*, *α*, *m*, *mdot*, Options]
returns a list containing tables with information specified by the option 'Output'->{'information1', 'information2', ...}. Template is passed in *file*. Disk is specified by BH mass *m*, and spin parameter *a* matter inflow *mdot* and parameter *α* (both in Shakura & Sunyaev definition by default).

DiskImageFromTemplate[*file_*, *a_*, *α_*, *m_*, *mdot_*, OptionsPattern[]]
functions takes the path to a template from which an image should be generated,
file, the dimensionless angular momentum of the black hole *a* the constant characterizing the efficiency of angular momentum transport *α*, the black hole mass *m*, the mass influx *mdot*, and an
options pattern.

The following options can be given:

"InputUnits"	"NovikovThorne"	This option specifies the units in which the user has provided the input. The default option is "InputUnits"–>"NovikovThorne", which expects the mass M to be given in geometrized units and the mass influx mdot to be dimensionless, $\dot{m} := \dot{M}/1014\ \mathrm{kg/s}$. Other accepted options are "InputUnits"–>"SI", "InputUnits"–>"CGS", and "InputUnits"–>"ShakuraSunyaev", the first two expecting SI and CGS units respectively, the last one expecting M to be given in solar masses and mdot to be given in multiples of the critical mass influx; the mass influx at which the Eddington luminosity is reached.
"OutputUnits"	"SI"	This option changes the units of the output functions (temperature and flux density). As of June 2024, only the default option "OutputUnits"–>"SI" is supported.
"rUnits"	"BHMass"	The output functions of DiskParams are functions of radius. This option changes the units of radius these functions expect. The default option is "rUnits"–>"BHMass", which expects the dimensionless r used throughout chapters 1 and 2, r = Rc2/(GM), where R is radius with dimension. Other supported options are "rUnits"–>"SI", "rUnits"–>"CGS", and "rUnits"–>"ShakuraSunyaev", the first two using the meters and centimeters as units respectively, and the last one using Shakura and Sunyaev's definition, $r = Rc^2/(6GM)$.
"Grid"	True	Specifies whether a grid of lines of constant r and *φ* should be generated over the data. Takes a boolean value.
"Output"	{MaximalFrequency}	Takes the list of keys to the association returned by the ObservedDiskElement function. The output will be a list of matrices with values corresponding to these keys. The default option is "Output"–>{"MaximalFrequency"}.

Tech Notes

KerrImages

Related Links

XXXX

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See Also

KerrNullGeoDistant ▪ DiskParams ▪ ObservedDiskElement ▪ GenerateTemplate ▪ DiskImage ▪

Related Guides

KerrImages

Examples Initialization

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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 using the GenerateTemplate function.

Generate 100 x 100 points with maximal Bardeen coordinate 20:

```
In[5]:= GenerateTemplate[Directory[], "template_a0.5_th0.45pi_size100x100_mBC20", 0.5, 0.45 π, {100, 100}, 20, 8]
```

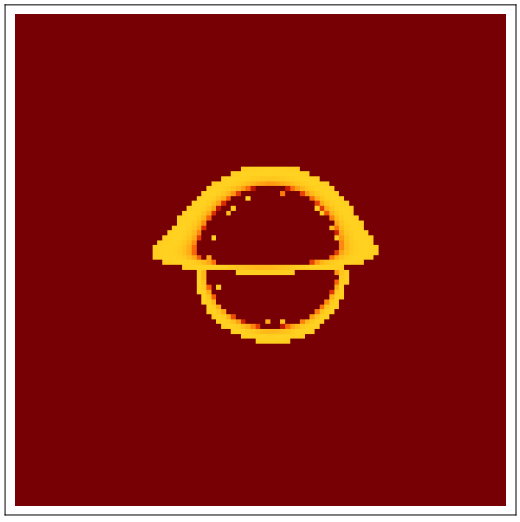
%

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

```
In[6]:= img = DiskImageFromTemplate[Directory[] <> "\\template_a0.5_th0.45pi_size100x100_mBC20.mx",
          0.5, 0.1, 1500, 1, "Grid" -> False, "Output" -> {"PhysicalTemperature"}];
```

```
In[7]:= ArrayPlot[Reverse[img[[1]]], ColorFunction -> "SolarColors"]
```

Out[7]=



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More Examples

Metadata

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

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Keywords

Syntax Templates

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