ObservedDiskElement

`ObservedDiskElement[disk, geodesic]`
returns an association containing information about accretion disk '*disk*' (assoc generated by DiskParams) radiation observed on geodesic '*geodesic*' (assoc generated by KerrNullGeoDistant). The keys are 'PhysicalTemperature', 'EffectiveTemperature', 'SpecificIntensity', 'Intensity' and 'PeakFrequency'.

ObservedDiskElement[disk_Association, geodesic_, OptionsPattern[]] takes as input an association *disk*, presumably generated by the DiskParams function (but a different association with matching keys and objects as the output of DiskParams is technically possible as well), and a geodesic object, presumably generated by the KerrNullGeo or KerrNullGeoDistant functions, and an options pattern.

The following option can be given:

"Grid"	True	Specifies whether a grid of lines of constant r and φ should be generated over the data. Takes a boolean value.

This function returns an association with the following keys:

"PhysicalTemperature"	This returns the surface temperature at the coordinates passed to the function through the geodesic object in geodesic["EmissionCoordinates"] .
"EffectiveTemperature"	This returns the temperature at which a black body with the observed intensity would raiate according to the Stefan–Boltzmann law.
"SpecificIntensity"	Returns the specific intensity calculated from disk["SpectralFluxDensity"] at the radius given by geodesic["EmissionCoordinates"] as a function of frequency, as it would be measured by the observer.
"Intensity"	Returns the integrated specific intensity given by disk["FluxDensity"]/π at the radius given by geodesic["EmissionCoordinates"] as it would be measured by the observer.
"PeakFrequency"	Returns the peak frequency given by given by disk["PeakFrequency"] at the radius given by geodesic["EmissionCoordinates"] as it would be measured by the observer.

Tech Notes

AlphaDiskModel

Related Links

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See Also

DiskParams ▪ **KerrNullGeoDistant** ▪ **KerrNullGeo** ▪ ⊕

Related Guides

AlphaDiskModel

Examples Initialization

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

Basic Examples

More Examples ▹

Generate the functions of the accretion disk with $\alpha = 0.1$ and an influx of 10^14 kg/s around a black hole with a solar mass and the spin parameter $a = 0.1$ using the DiskParams function:

```
In[32]:= disk = DiskParams[0.6, 0.1, 1500, 1]
```

Compute a geodesic in geometry given by $a = 0.6$, with the initial values $\theta = \pi/3$, $\alpha = 6$, $\beta = 7$ using the KerrNullGeoDistant function:

```
In[9]:= geod = KerrNullGeoDistant[0.6, π / 3, 6, 7];
```

Generate the association of observed values:

```
In[11]:= observedElement = ObservedDiskElement[disk, geod];
```

Get the physical temperature of the observed element:

```
In[12]:= observedElement["PhysicalTemperature"]
```

```
Out[12]= 6.6642 × 10^6
```

More Examples ⓘ

Metadata

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

Categorization ⓘ

Keywords

Syntax Templates