Observation for TeV candidate of HMXB XTE J1858+034

Presenter: Xinpeng Cui

School: Guizhou Normal University

Collaborator:Shaoqiang Xi Xiaoli Huang

Jian Li Guangwei Wang

LHAASO Data Analysis

XTE J1858+034 is located at the center of the TeV source LHAASO J1858+0330. The source LHAASO J1858+0330 exhibits an extended structure of 0.52°.

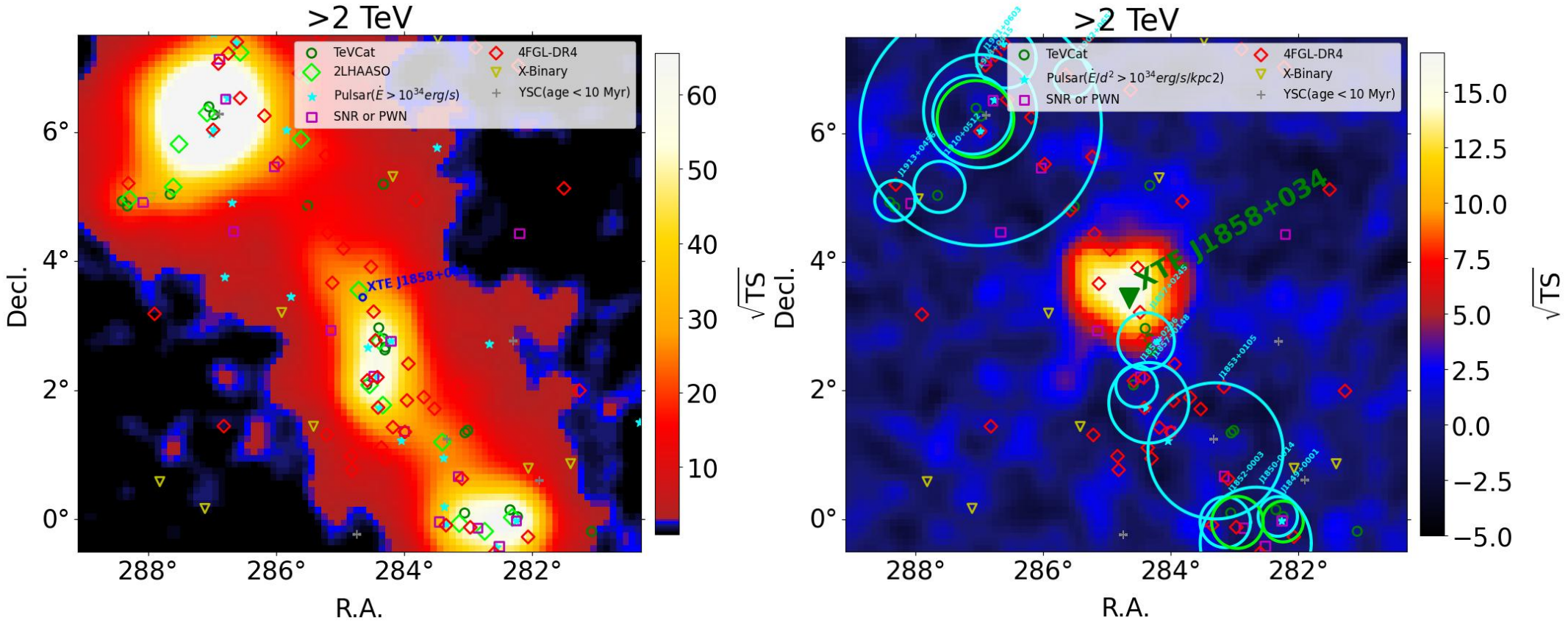


Figure 1:The left panel shows the TS map within an 8.8° mutiplied by 8° region centered on LHAASO J1858+0330(R.A. = 284.71° , Decl. = 3.55°), while the right panel displays the TS map after excluding all other sources except this one.

LHAASO Data Analysis

Table 1: Morphological Fit Results for J1858+0330

Energy	Spatial Model	TS	R.A. deg	Decl. deg	Major Axis deg	Minor Axis deg	Position Angle	AIC
> 2TeV	Point	264.4	284.5815	3.6055				0
	Gaussian	**574.0**	**284.6902**	**3.5778**	**0.5199±0.024**			**-299.084**
	Elliptical gaussian	577.3	284.6905	3.5794	0.5336±0.033	0.4972±0.031	0	-295.722
	Disk	531.9	284.7250	3.5682	0.6551±0.016			-260.106

Note that TS differences cannot be used to quantitatively determine the best-fit model when models are non-nested.
The Akaike information criterion (AIC; Akaike, 1974) was employed for model comparison.
The AIC values are subtracted from that of the point model for a clear comparison.
A comparison shows that the Gaussian model yields the smallest AIC value and is therefore adopted.

LHAASO Data Analysis

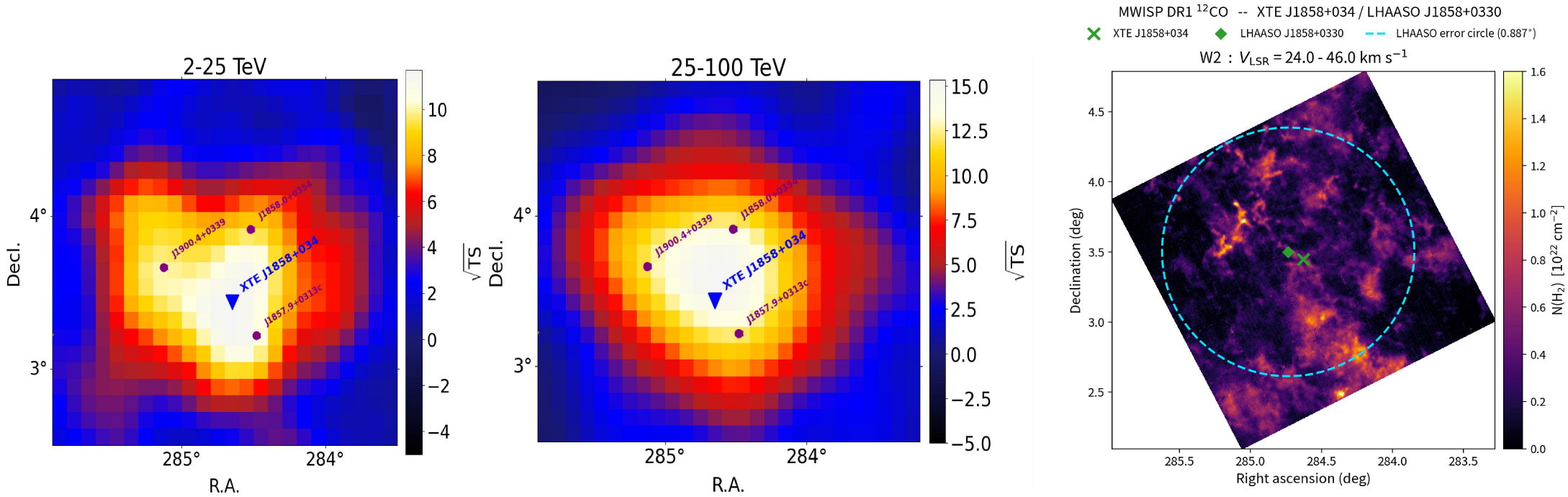


Figure 2:The left panel shows the TS map of WCDA (2 TeV < E < 25 TeV), the middle panel shows the TS map of KM2A (25 TeV < E < 100 TeV), and the right panel shows the molecular cloud distribution map corresponding to the speed range of this source.

LHAASO Data Analysis

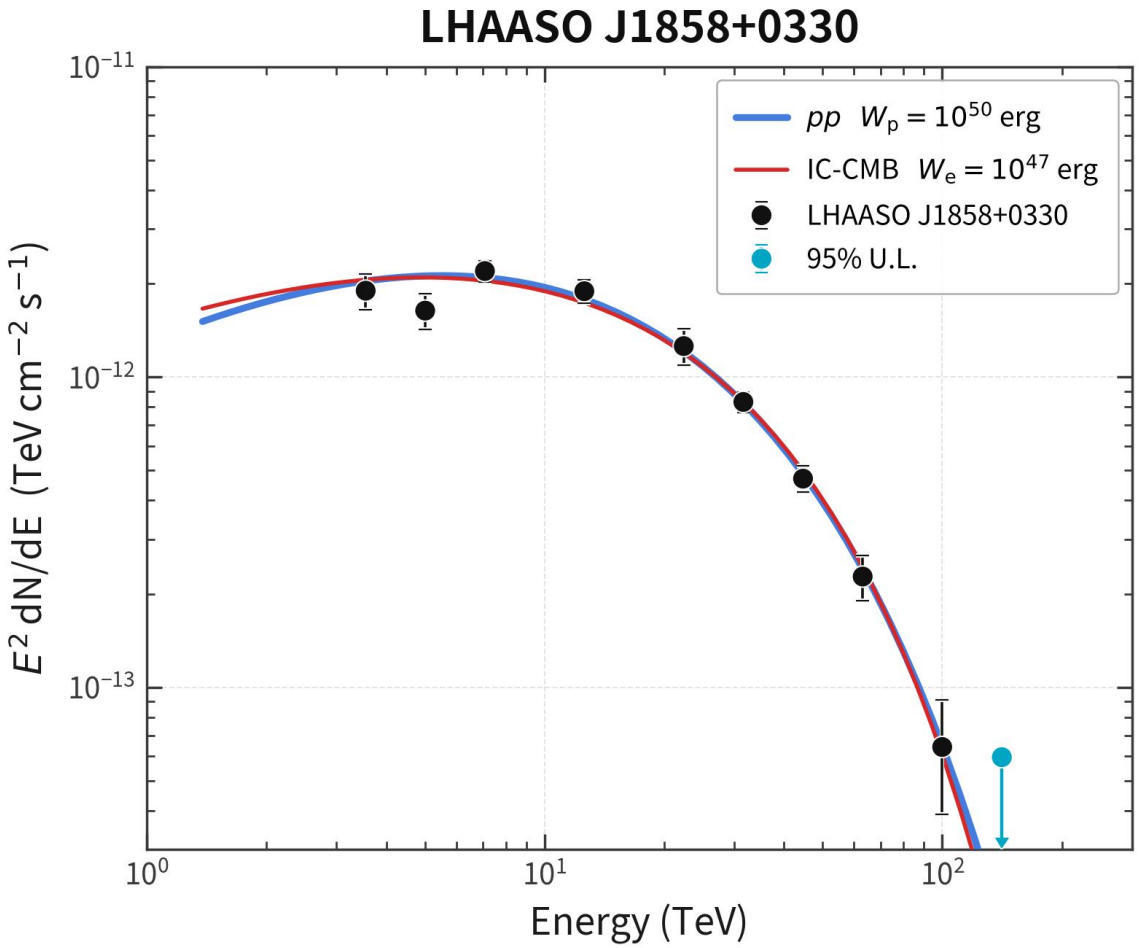


Figure 3: Energy spectrum of J1858+0330 observed by LHAASO.

The molecular cloud density at the source location is about 5 cm^{-3}

IC-CMB IC-IR IC-star temperature (2.7 K / 30.9 K / 5222.8 K) energy density(0.26, 0.50, 0.48)

Thank You!