

Astroteilchenphysik II: Gammastrahlung

Vorlesung 8

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Magnetosphäre von Neutronensternen

- Goldreich-Julian-Modell für Magnetfeld von Pulsaren
- Modelle für Teilchenbeschleunigung

Pulsarwind-Nebel-Systeme

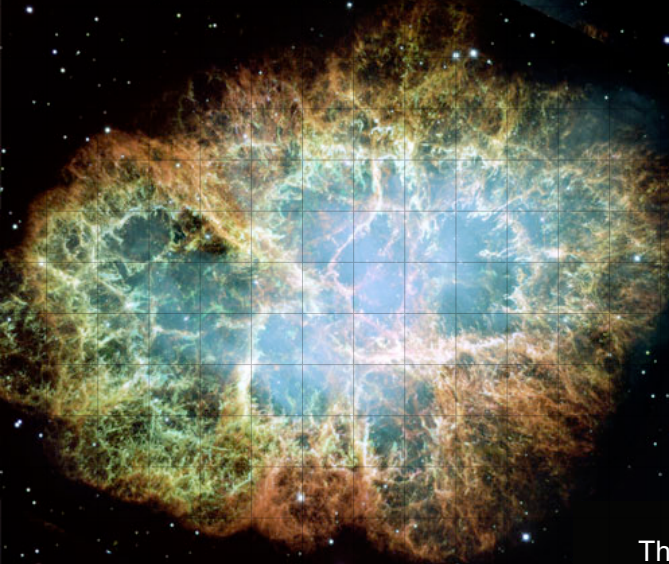
- Energietransport vom Pulsar zum Nebel
- Photonspektren und deren Interpretation

Seyfert-Galaxien, Quasare, Blazare

- Beobachtungen von variablen, extragalaktischen Objekten
- Interpretation als Aktive Galaktische Kerne
- Physikalische Prozesse und Parameter
- Indirekter Nachweis von Schwarzen Löchern

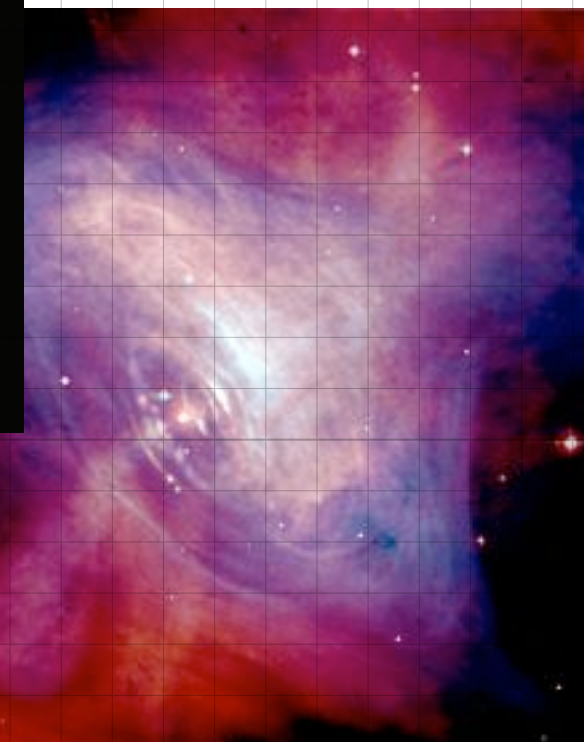
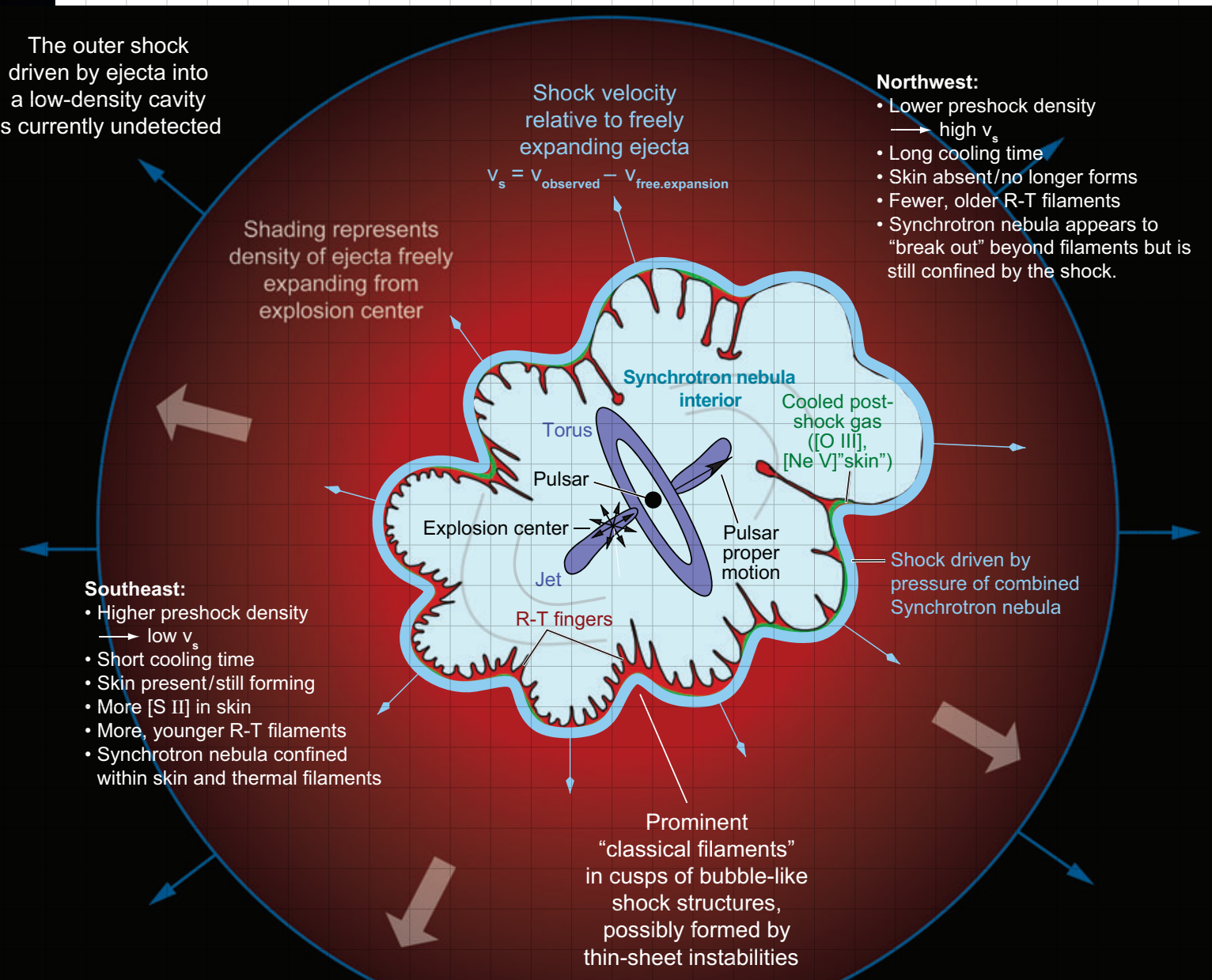
Vorlesung: Termine

Dienstag		Donnerstag	
		23.04.2020	Vorlesung
		30.04.2020	Vorlesung
		07.05.2020	Vorlesung
12.05.2020	Übung	14.05.2020	Vorlesung
		-	Feiertag
		28.05.2020	Vorlesung
		04.06.2020	Vorlesung
09.06.2020	Übung	-	Feiertag
		18.06.2020	Vorlesung
23.06.2020	Übung	25.06.2020	Ausgefallen
		02.07.2020	Vorlesung
07.07.2020	Übung	09.07.2020	Vorlesung
		16.07.2020	Vorlesung
21.07.2020	Übung	23.07.2020	Vorlesung

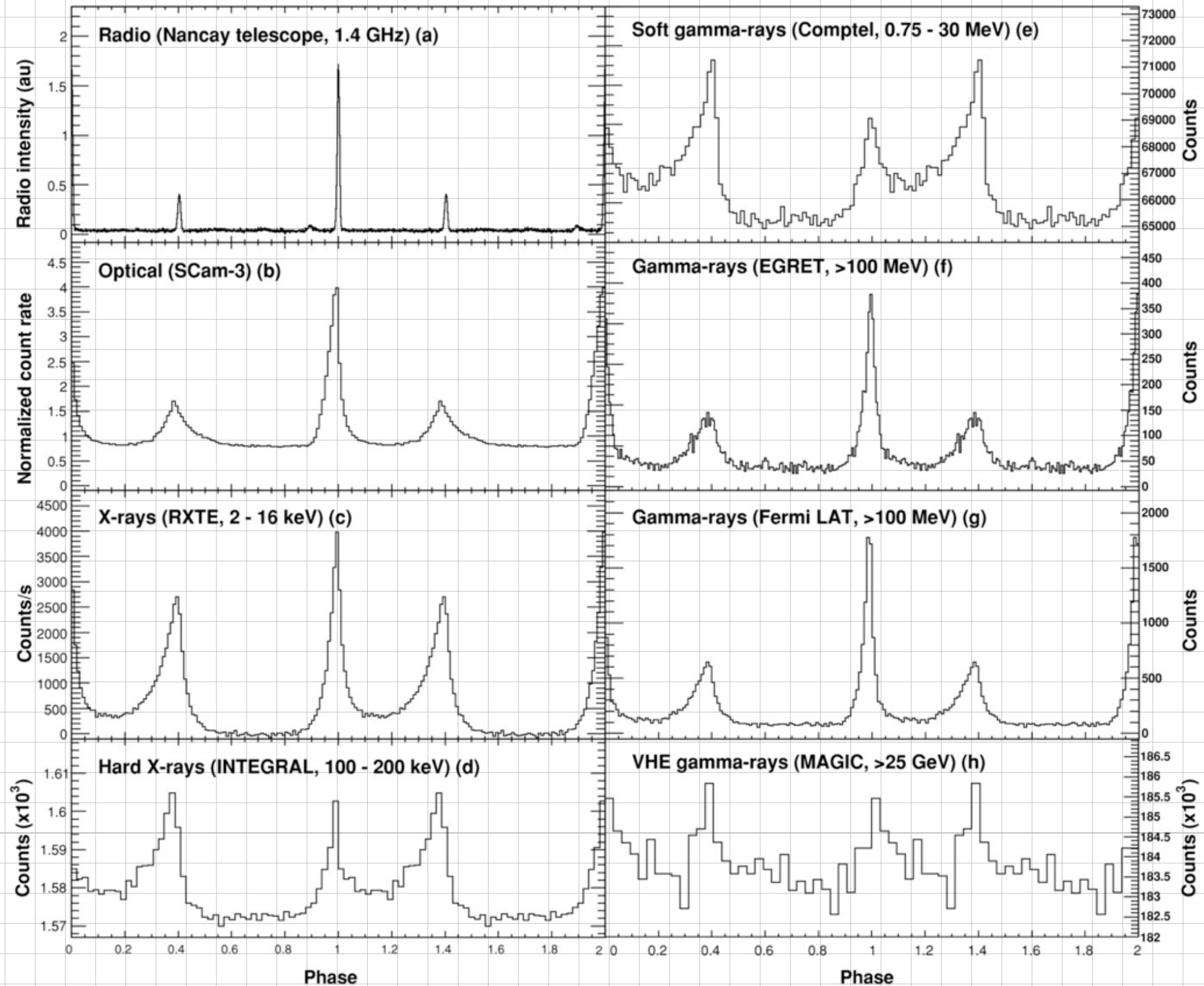


Krebsnebel: Pulsar im Zentrum

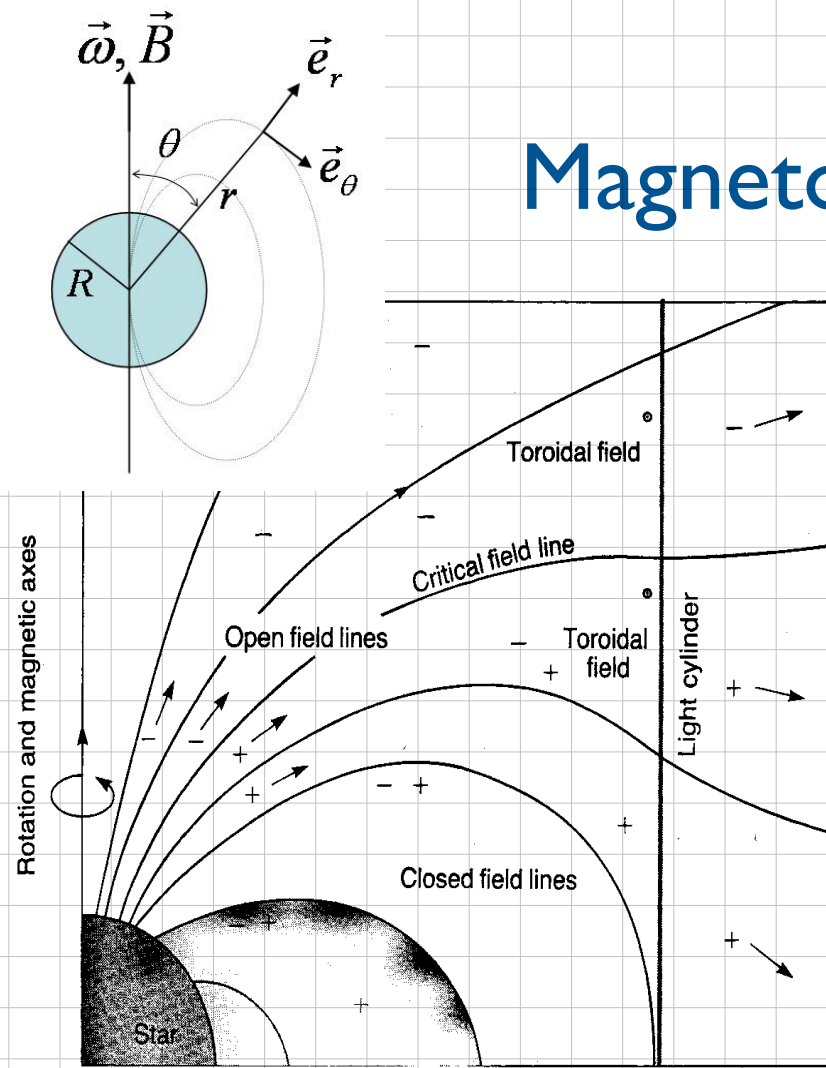
The outer shock driven by ejecta into a low-density cavity is currently undetected

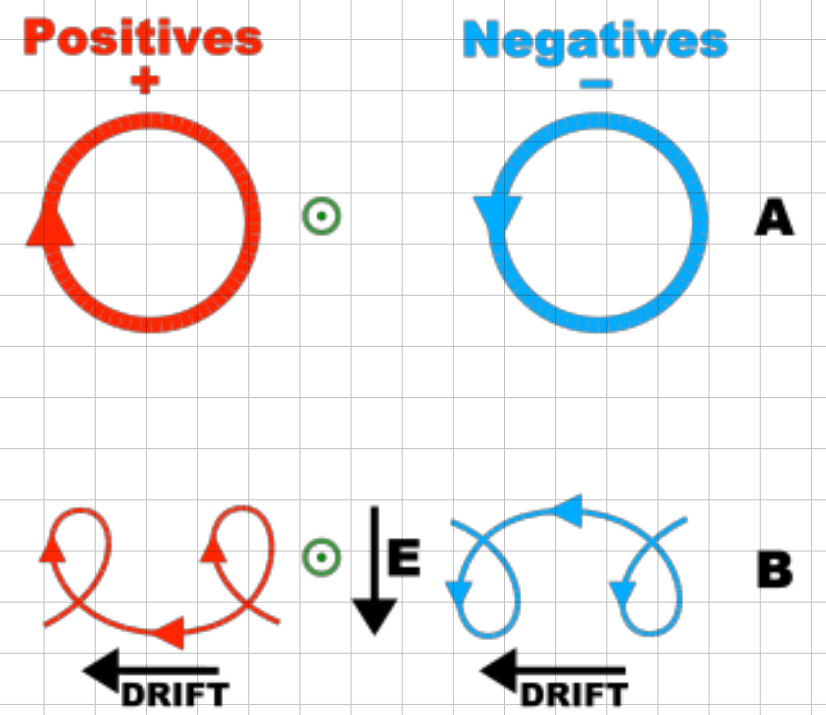


Krebsnebel: Zeitabhängigkeit des Signals

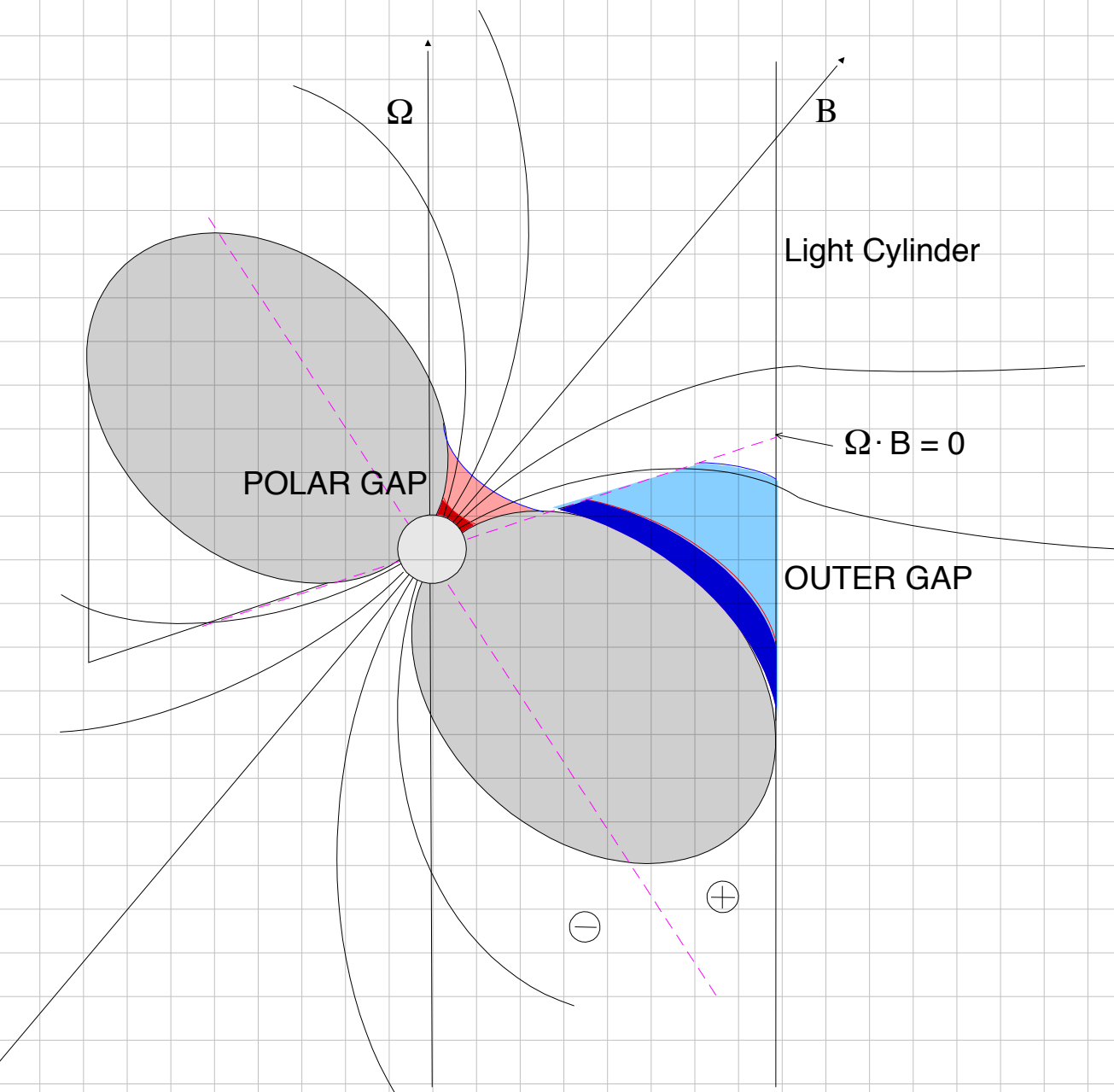


Magnetosphäre von Neutronensternen

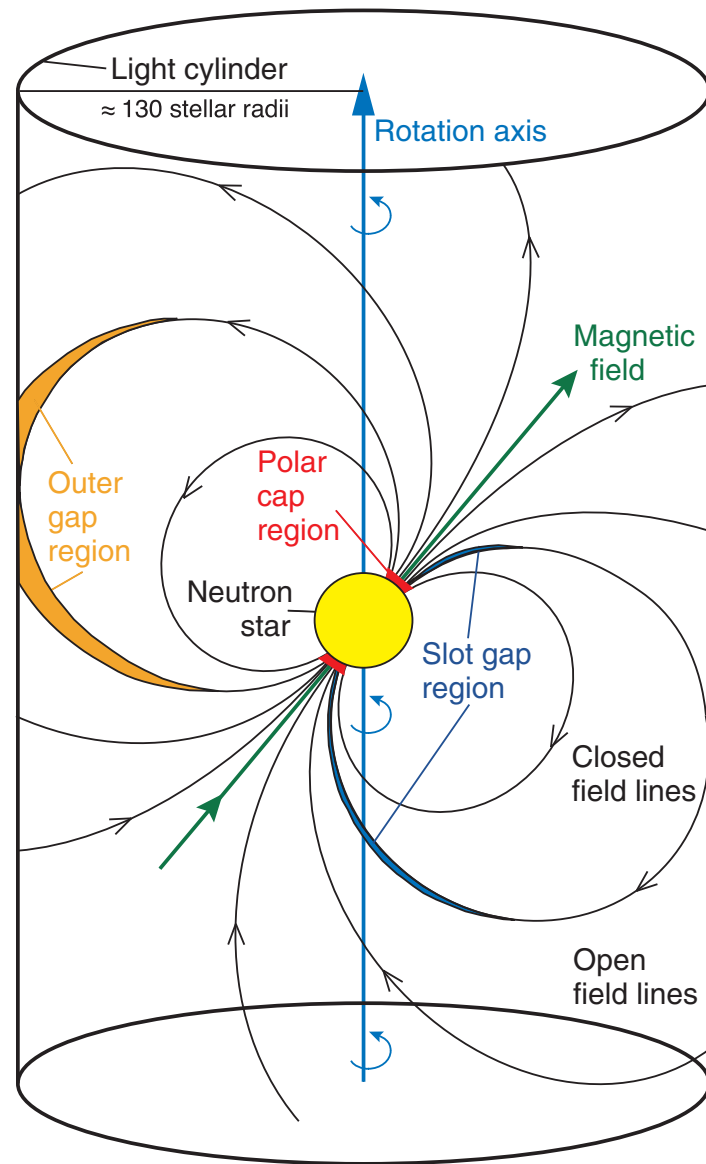




Magnetosphäre und Raumladungen

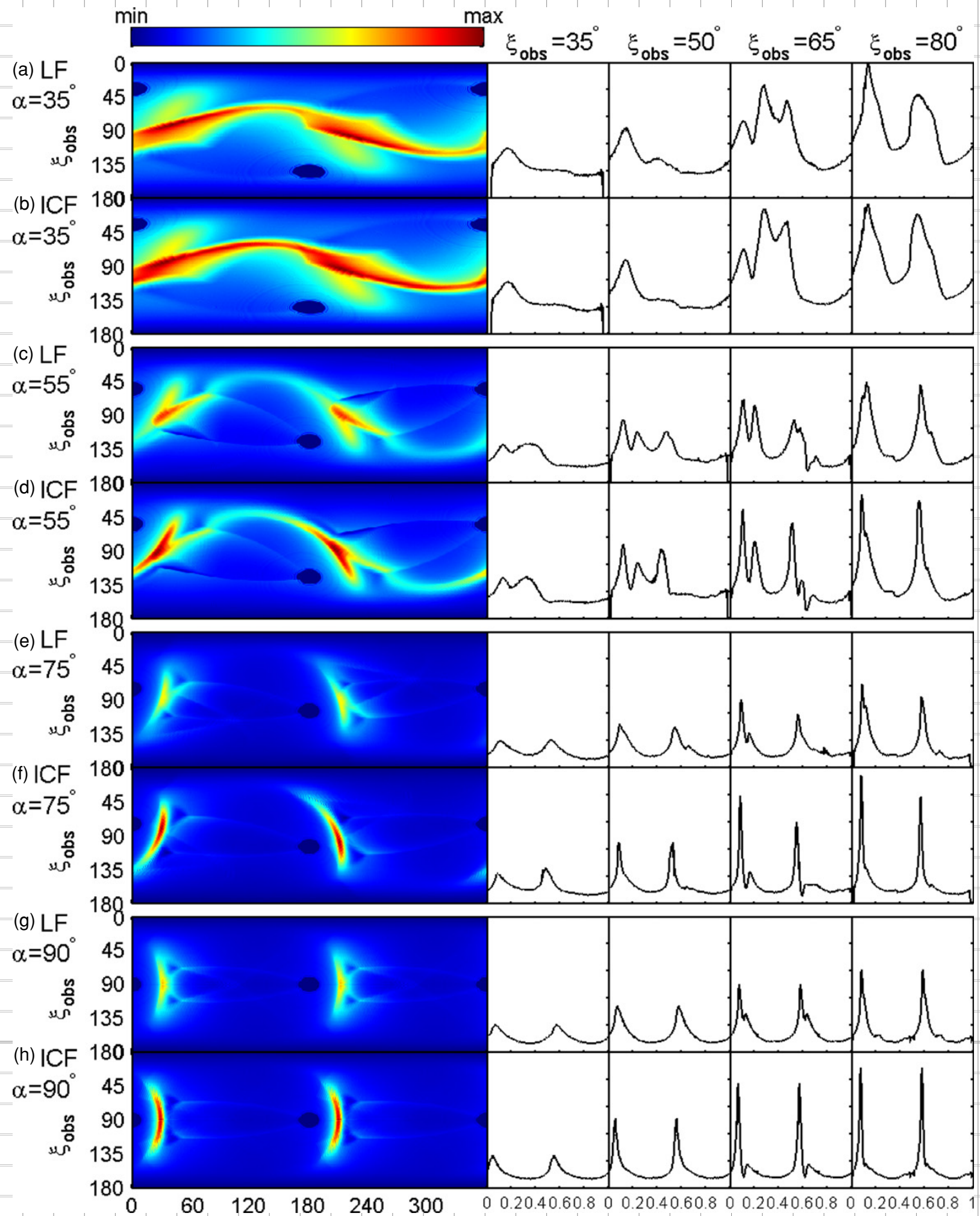
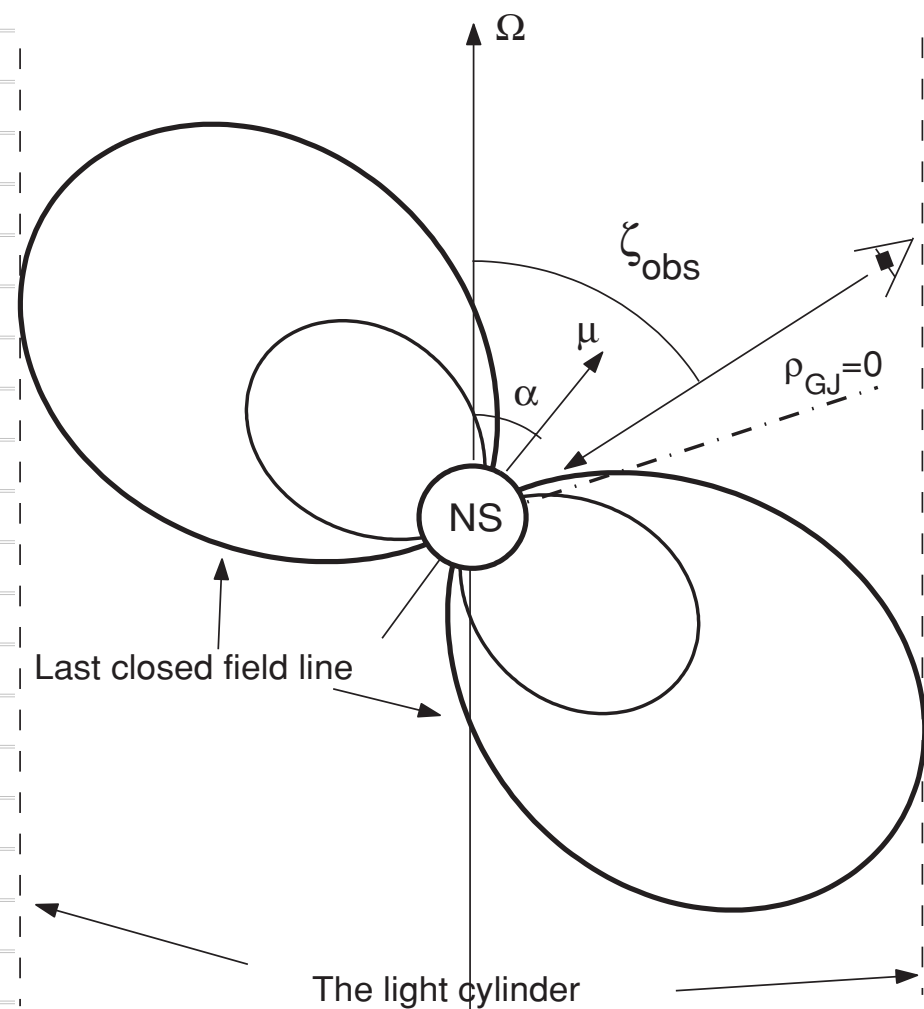


Teilchenbeschleunigung und Gamma-Strahlung

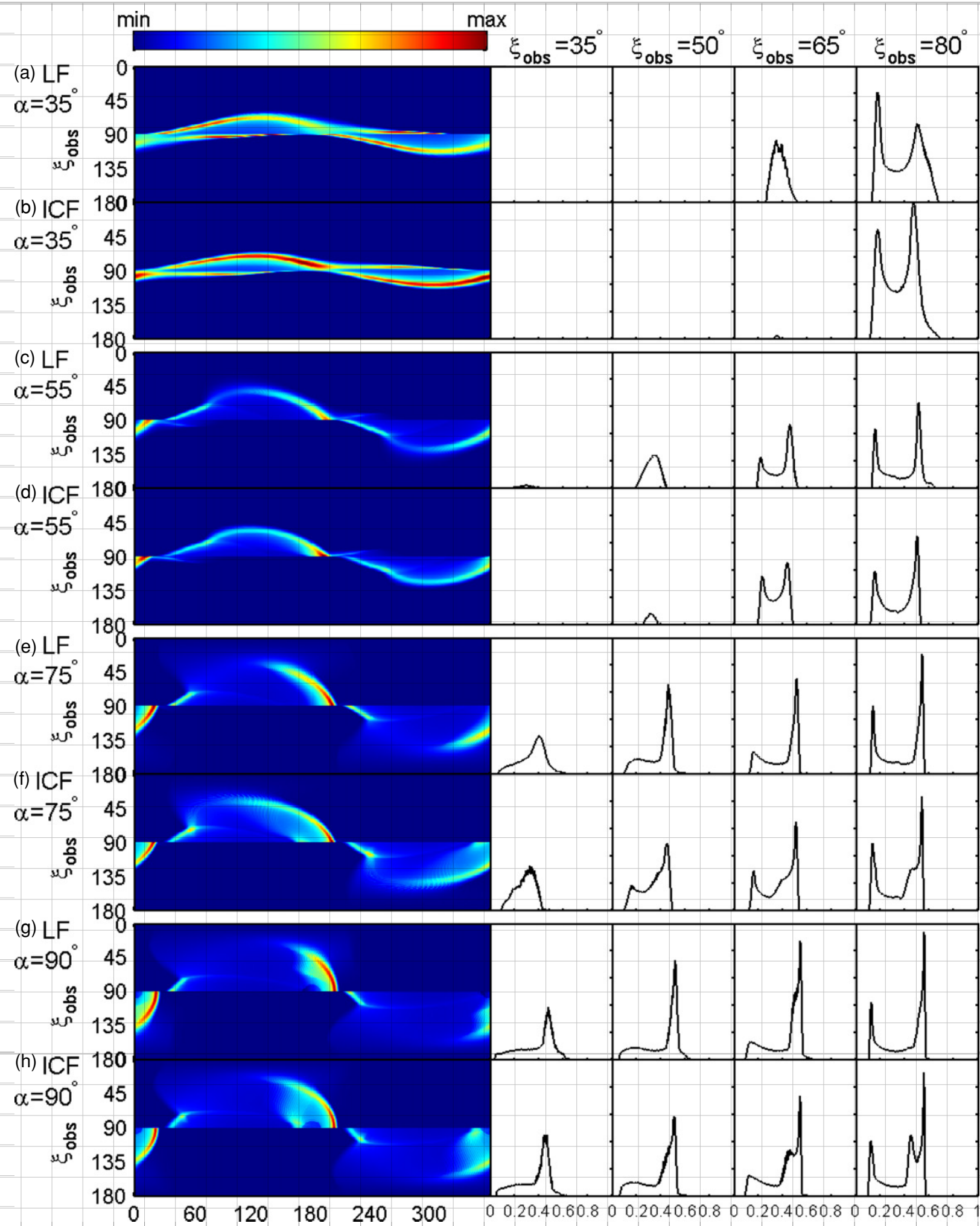
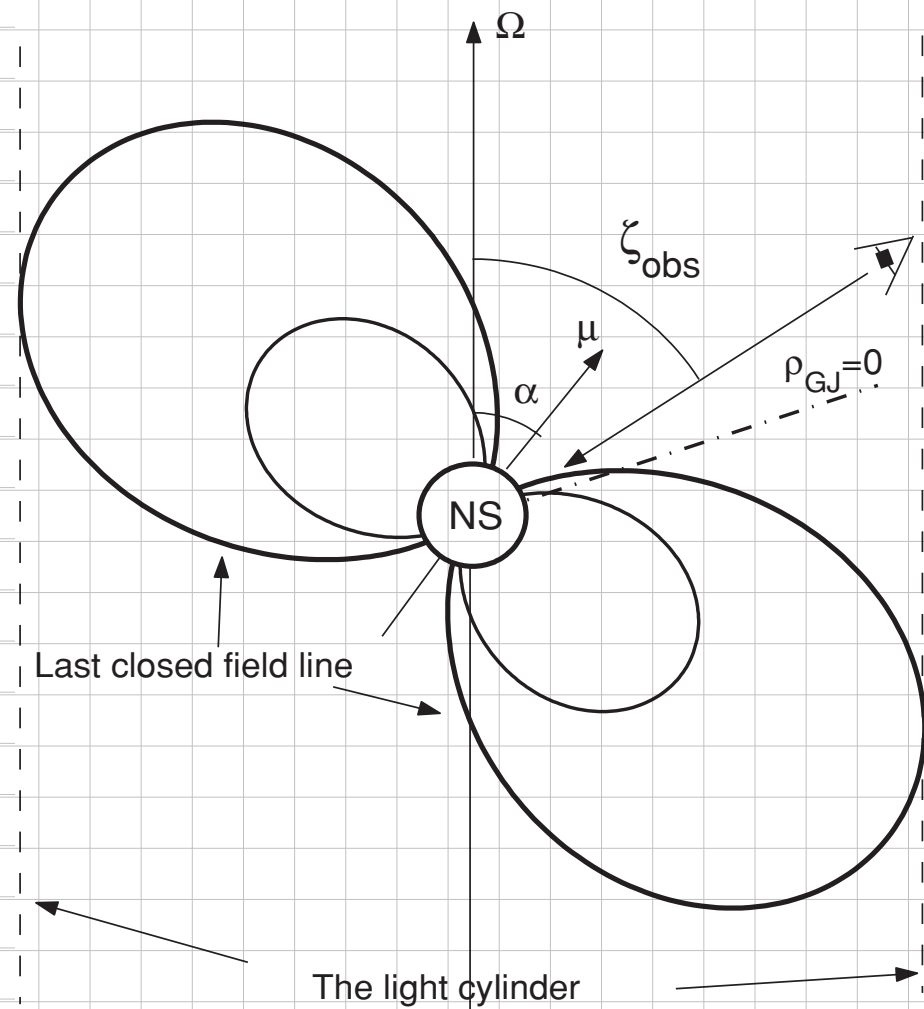


Synchrotron- und Krümmungsstrahlung

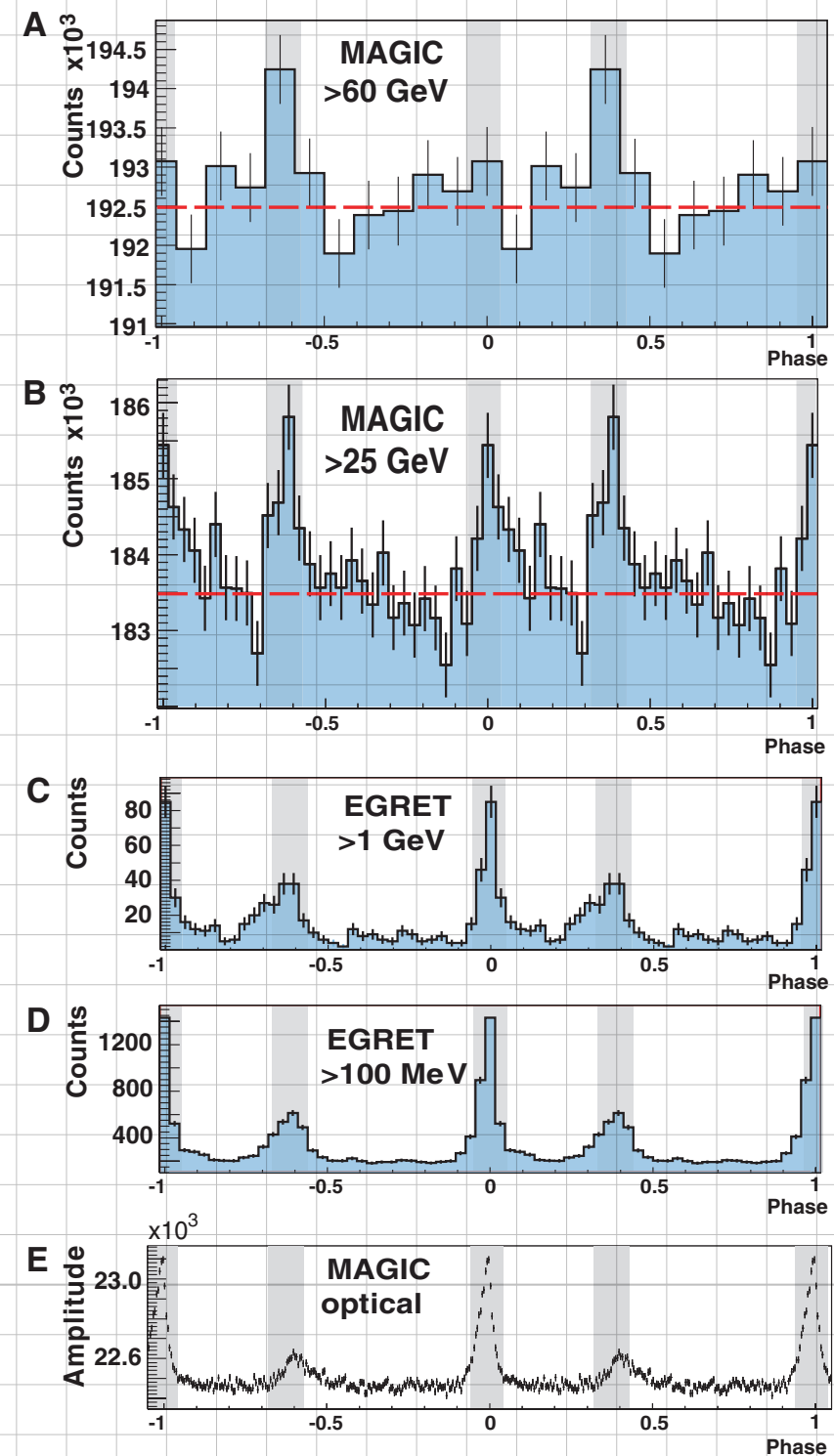
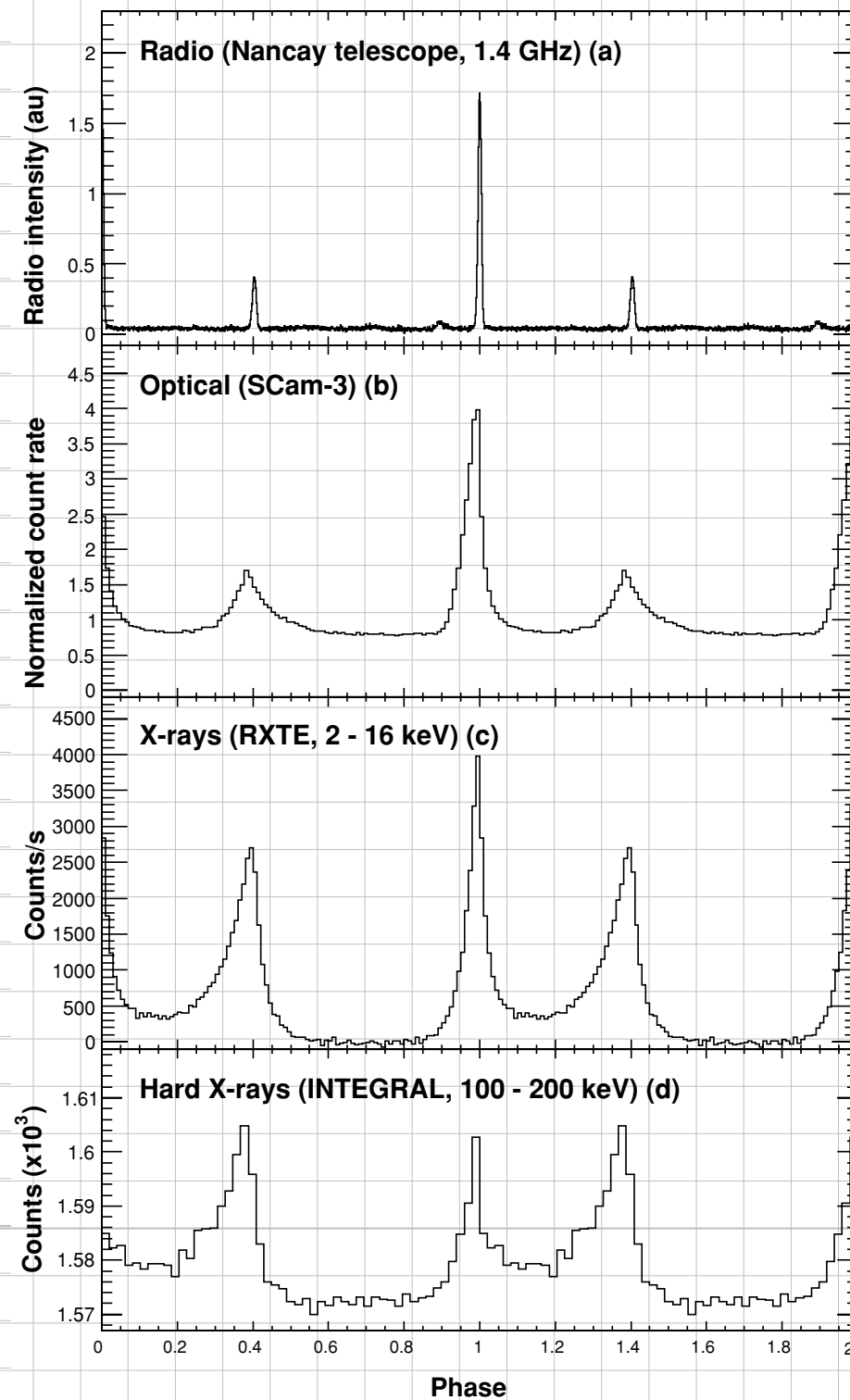
Erwartete Zeitprofile: Polkappen-Modell



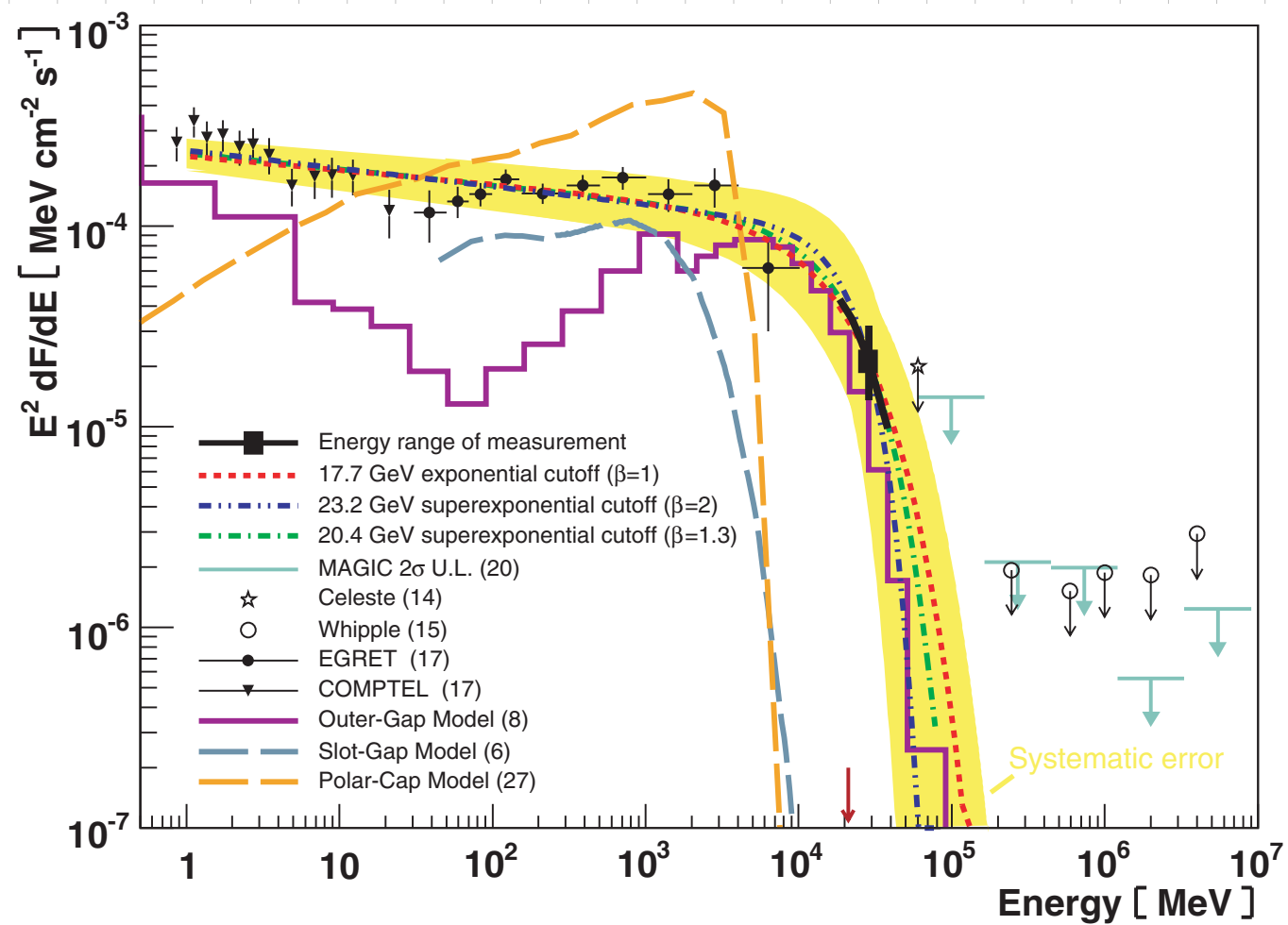
Erwartete Zeitprofile: Äußere-Lücke-Modell



Photonenspektrum des Krebspulsars

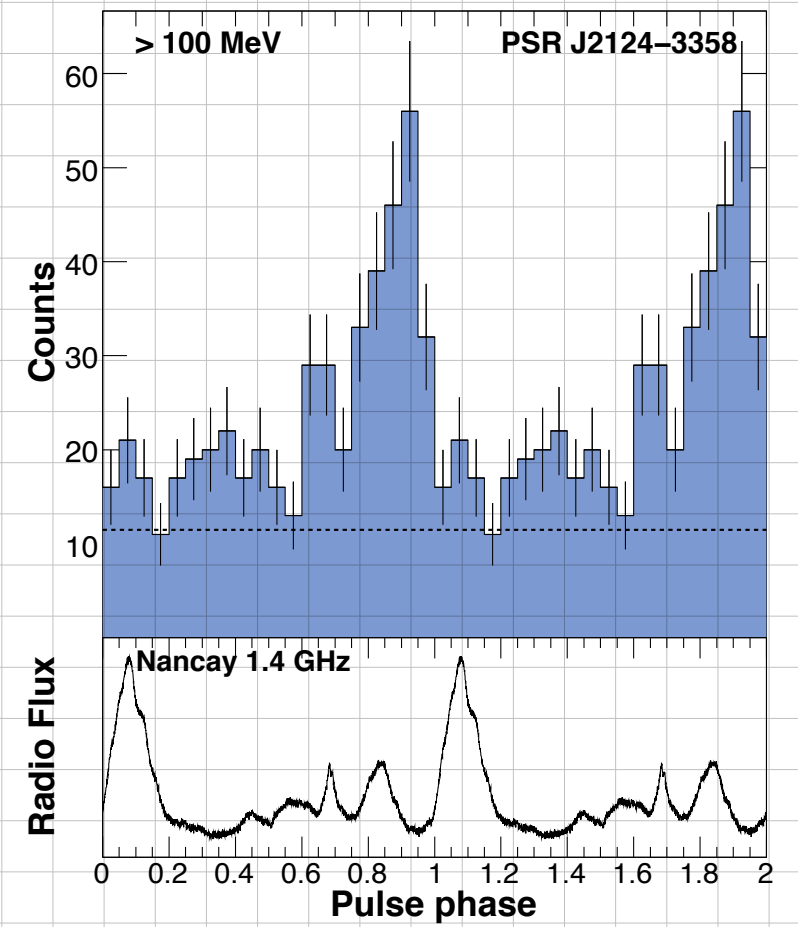
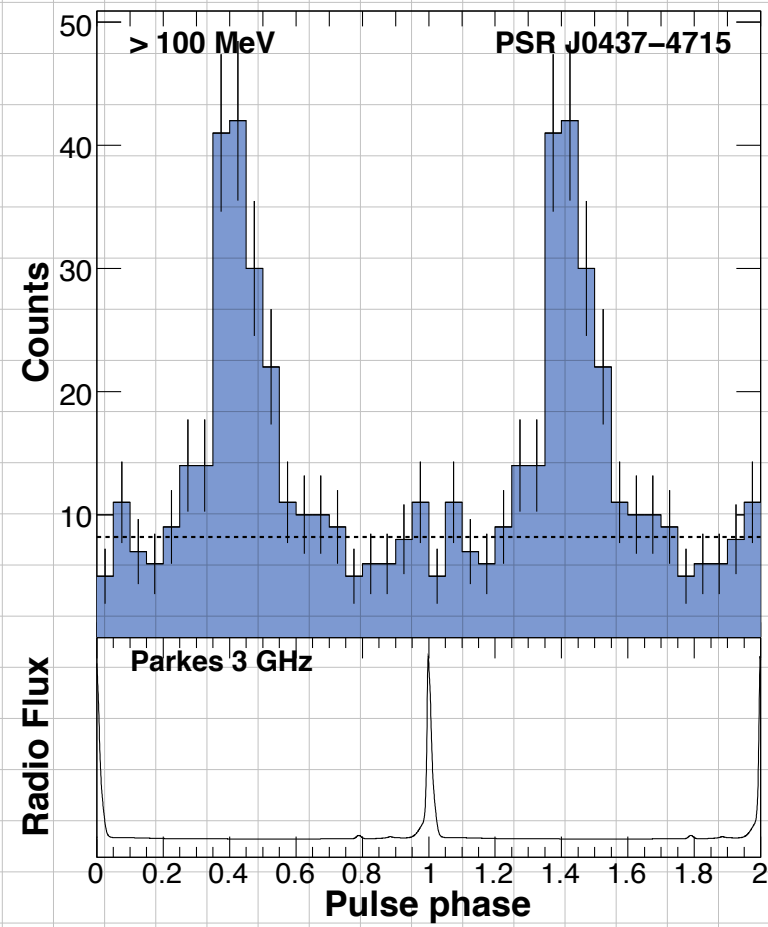
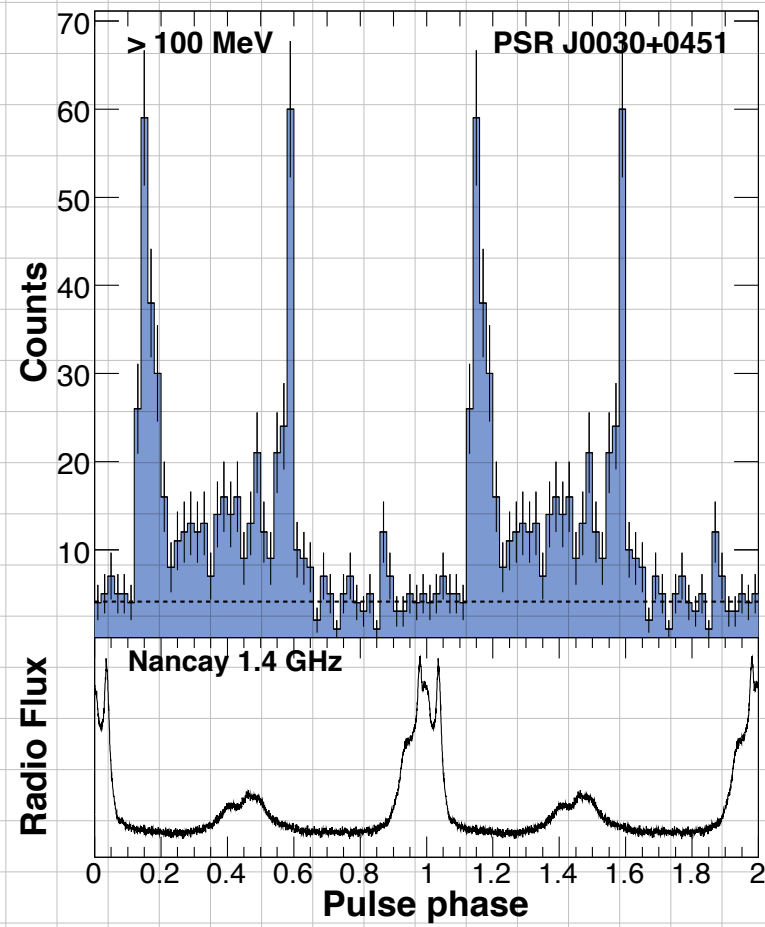


Beschleunigungsregionen und Energiebereiche

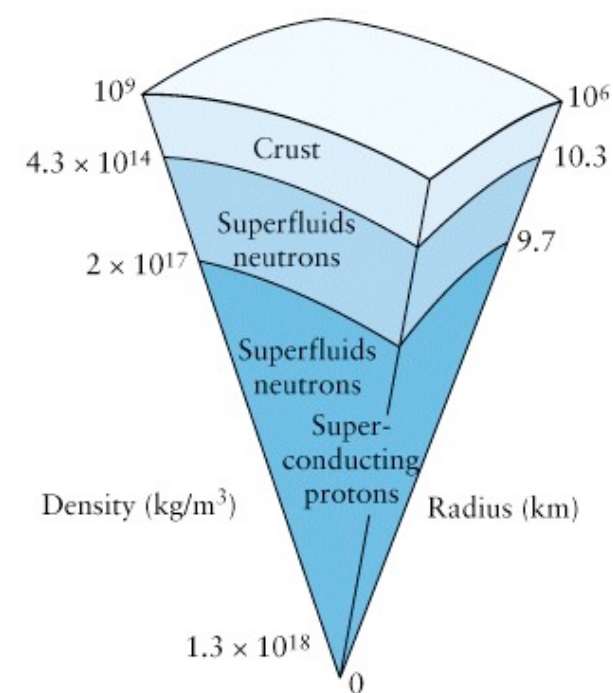
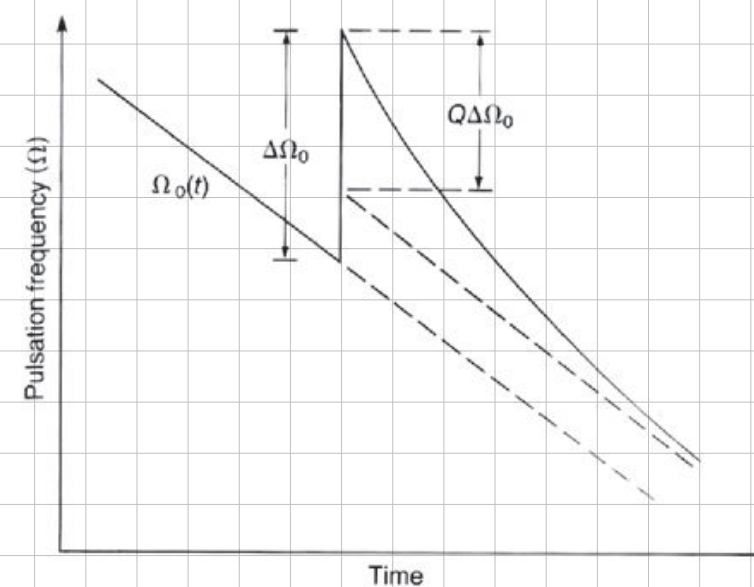
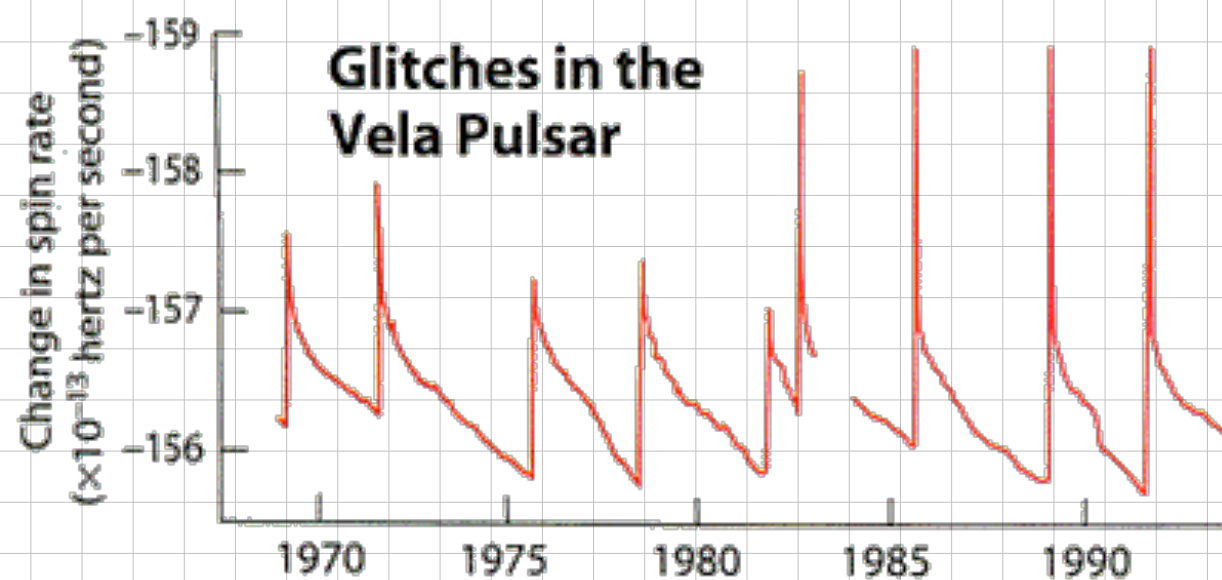


(MAGIC collab. Science Vol 322 21 2008)

Signalprofile anderer Pulsare



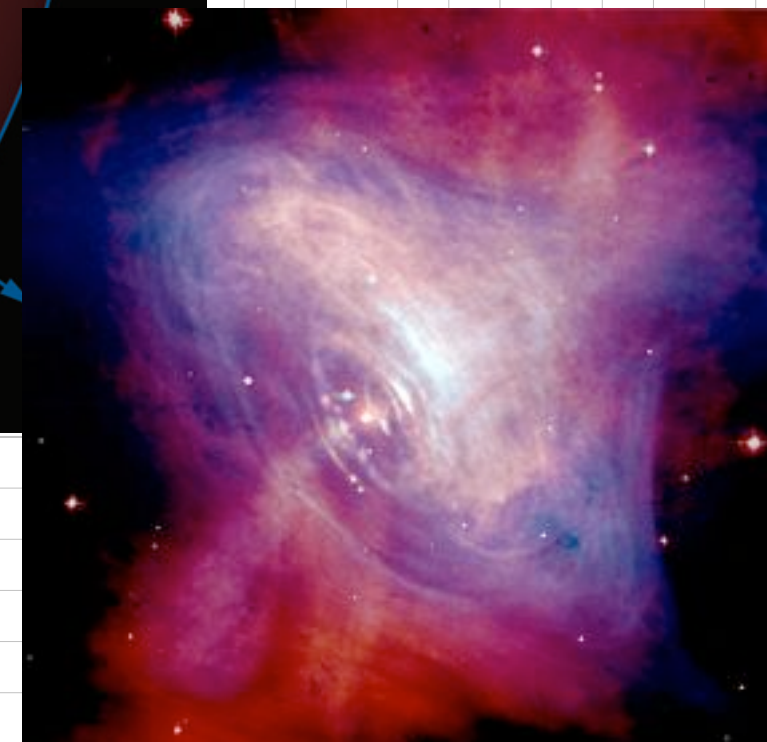
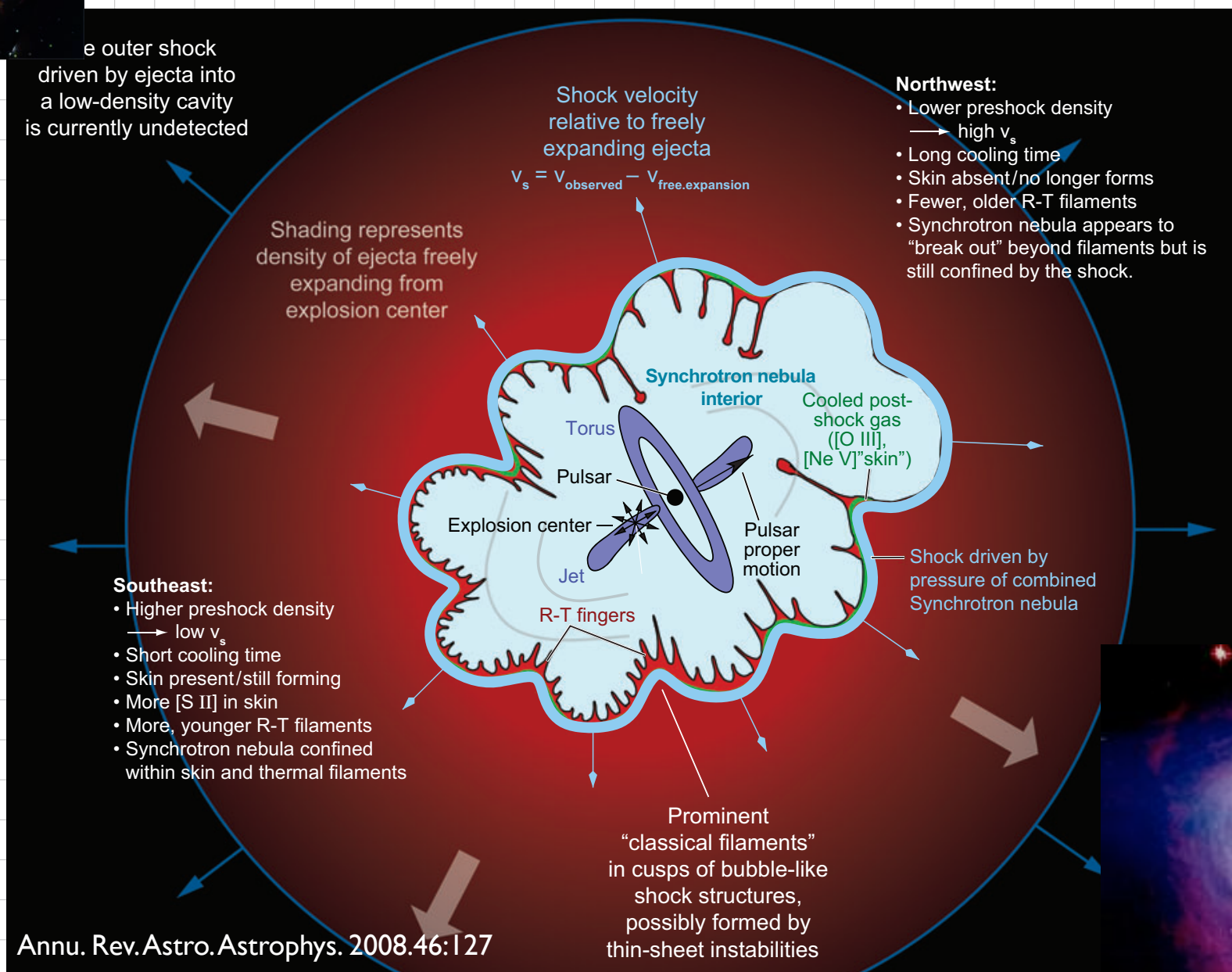
Sprünge in der Umlaufzeit (Glitches)



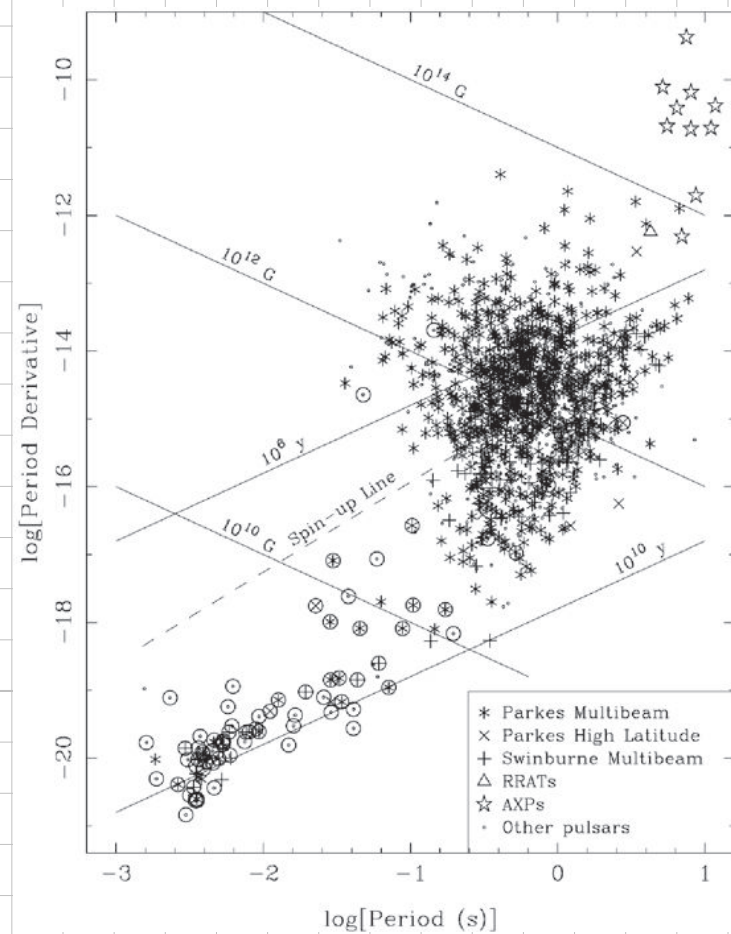


Krebsnebel

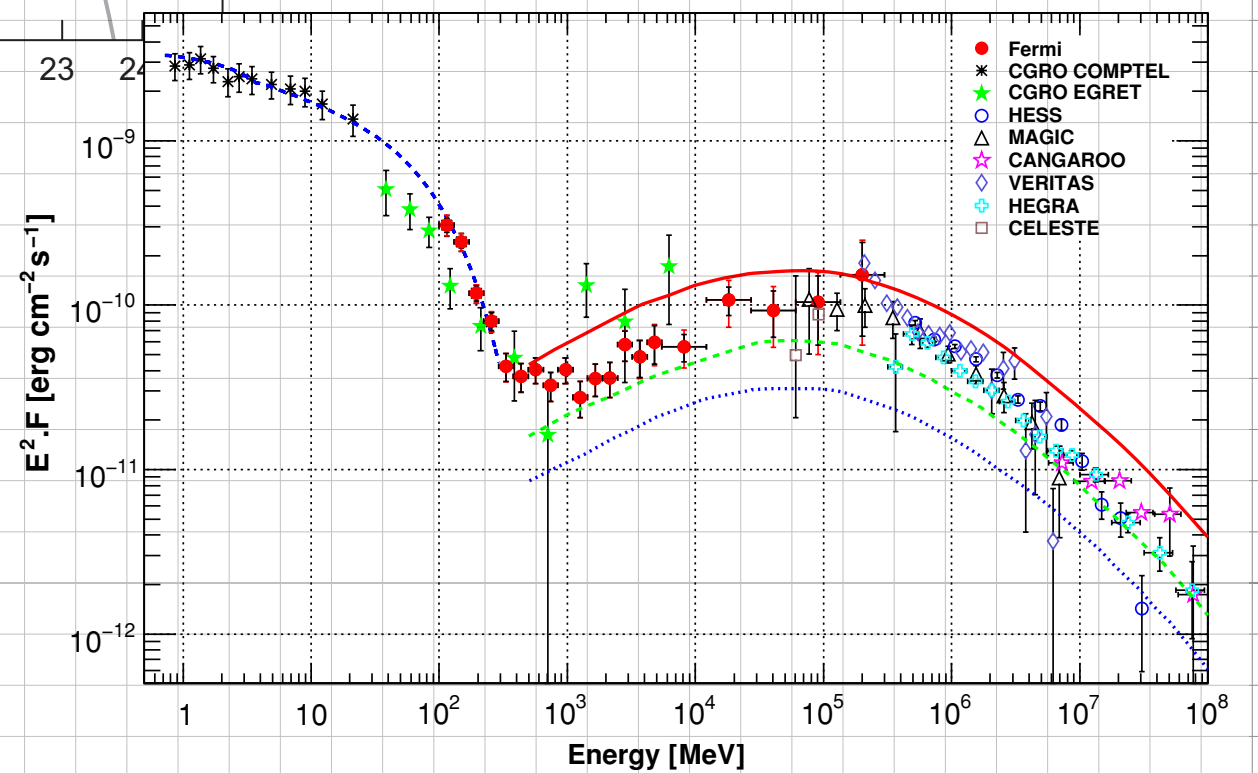
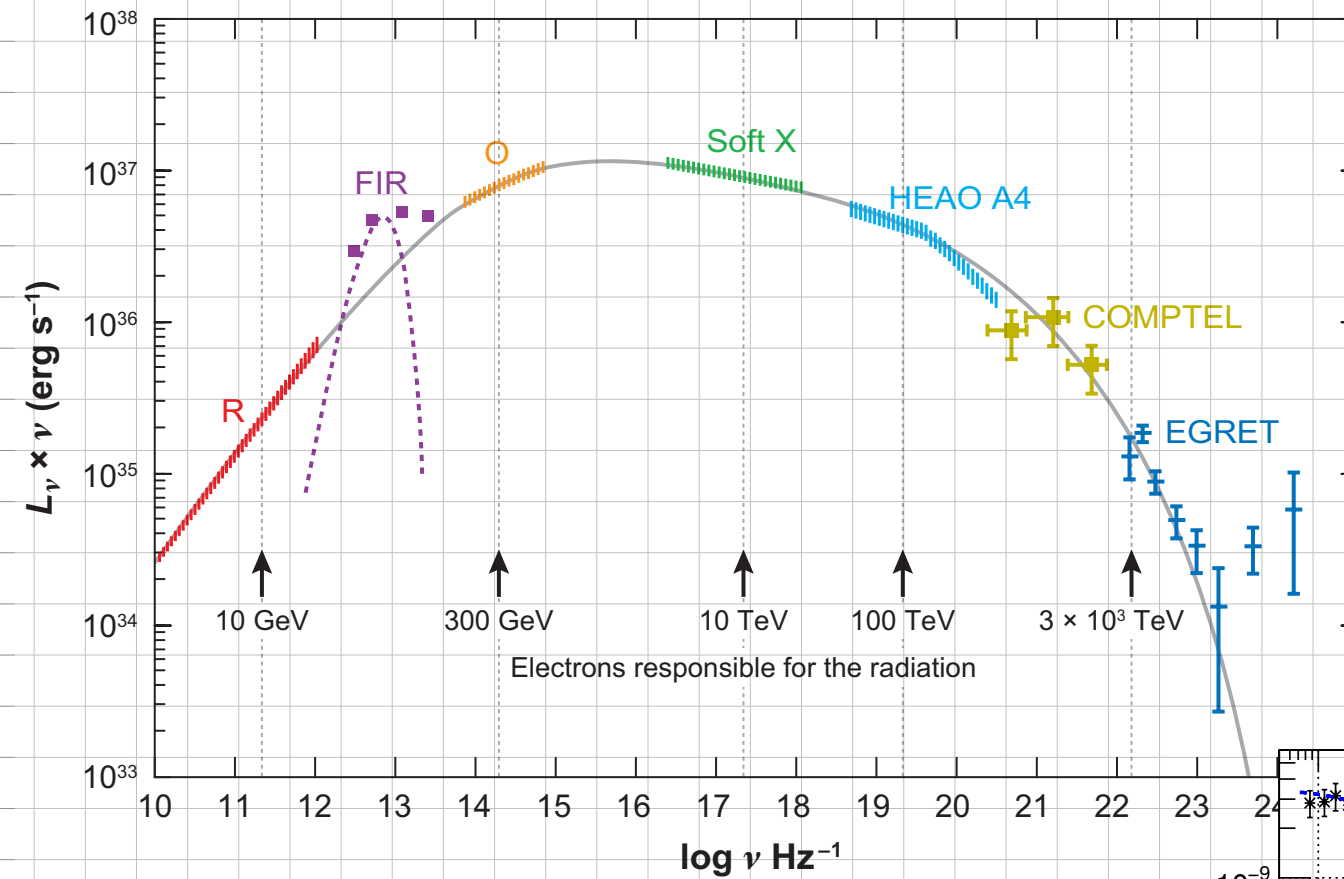
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Pulsarwind als Energiequelle für Schockfronten



Photonspektrum des Krebsnebels



Entdeckung 2011: Strahlungsausbrüche (flares)

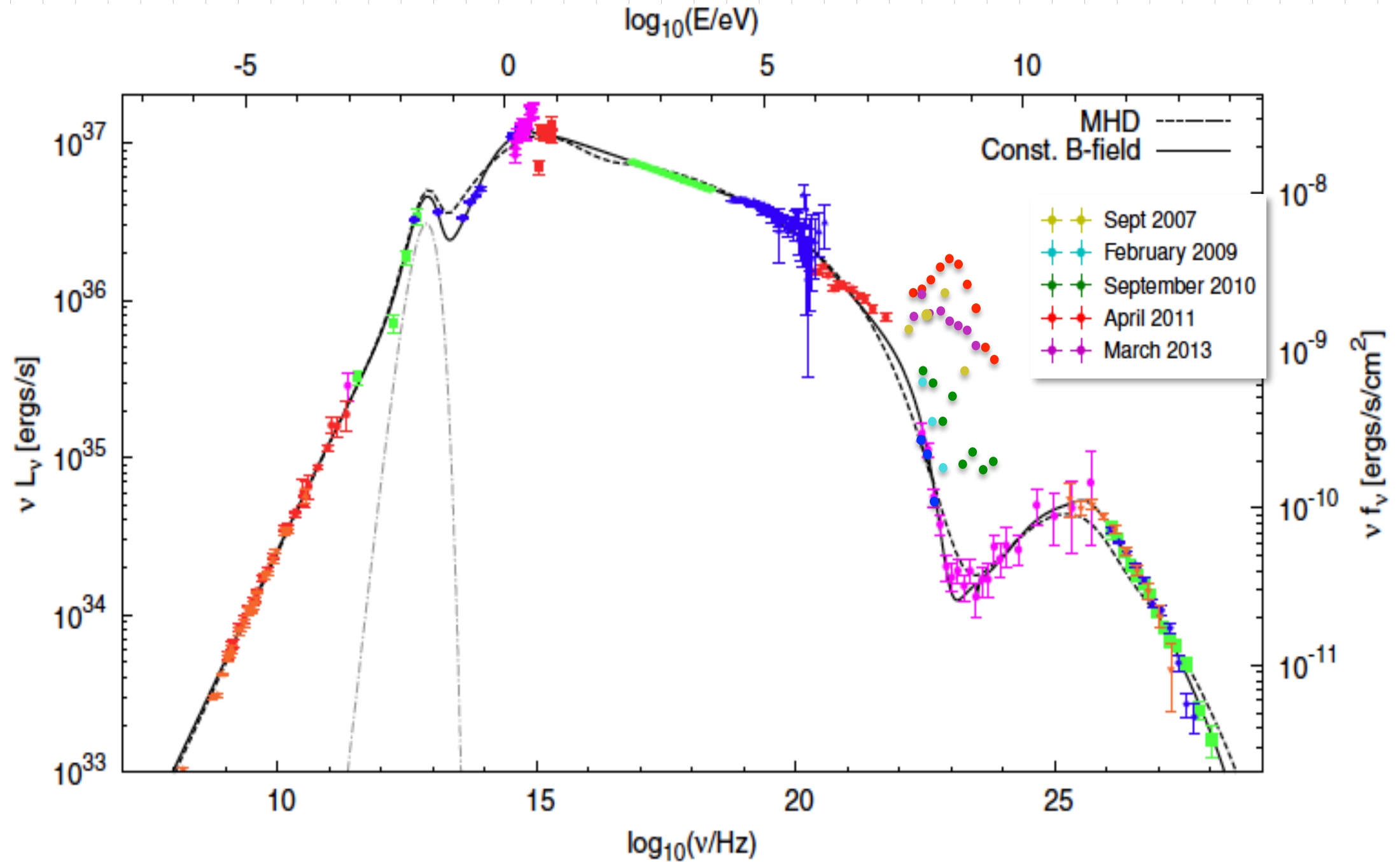
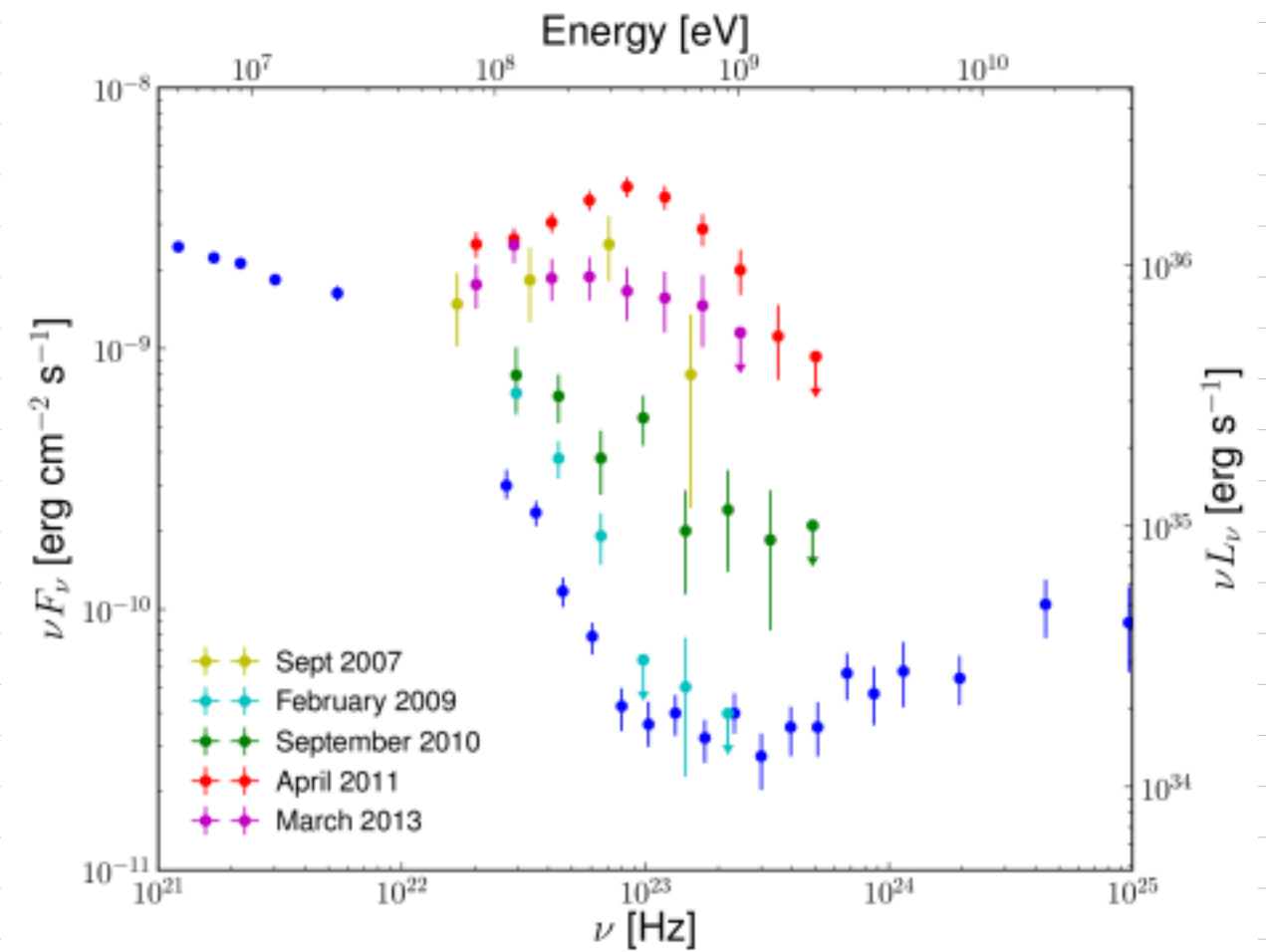
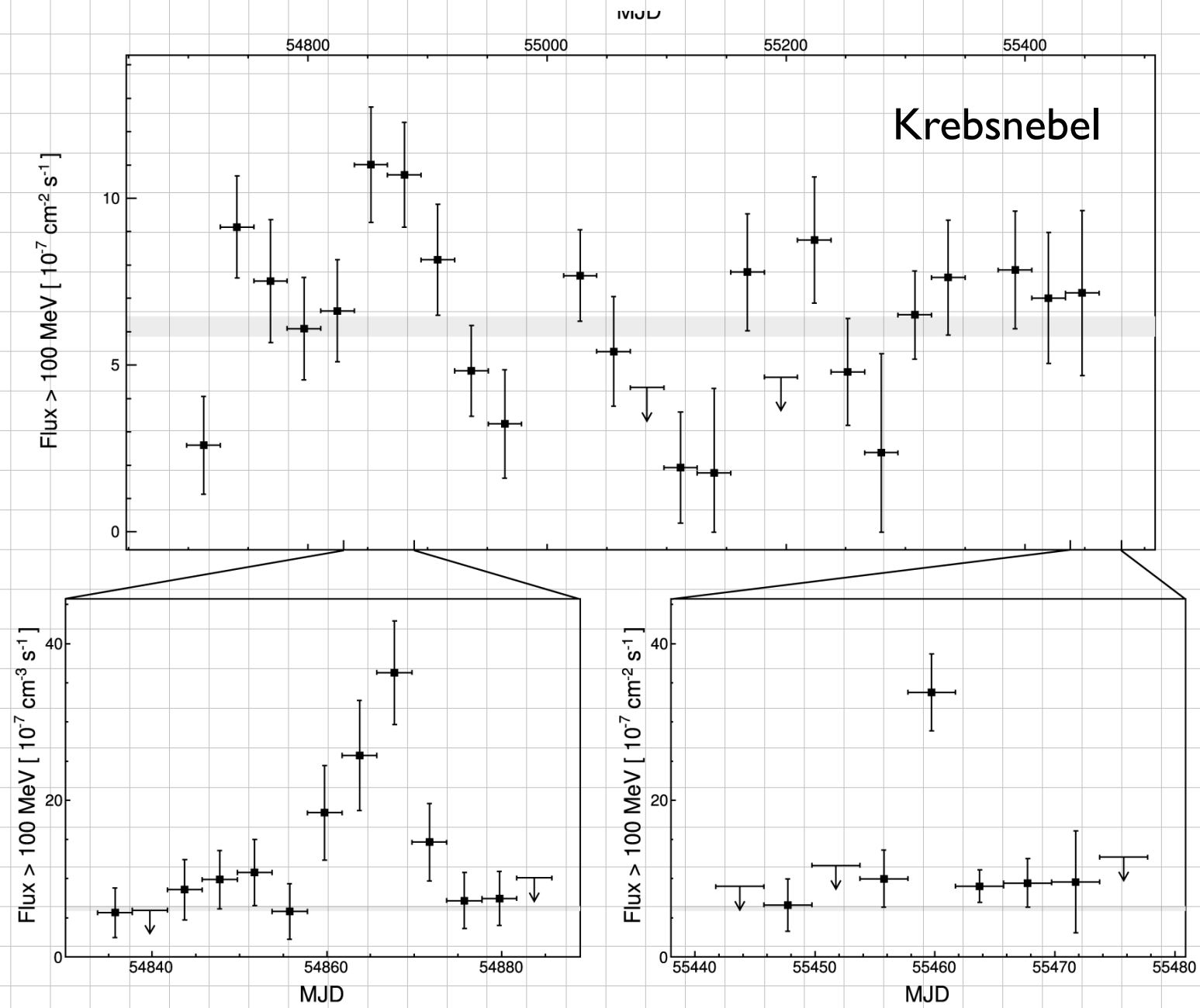


Figure 12. Spectral energy distribution of the Crab nebula from the radio to very high energy γ rays (from [172]). Also shown are the detected flares above 100 MeV, from [173].

Entdeckung 2011: Strahlungsausbrüche (flares)



Zeitlicher Verlauf der Gamma-Intensität



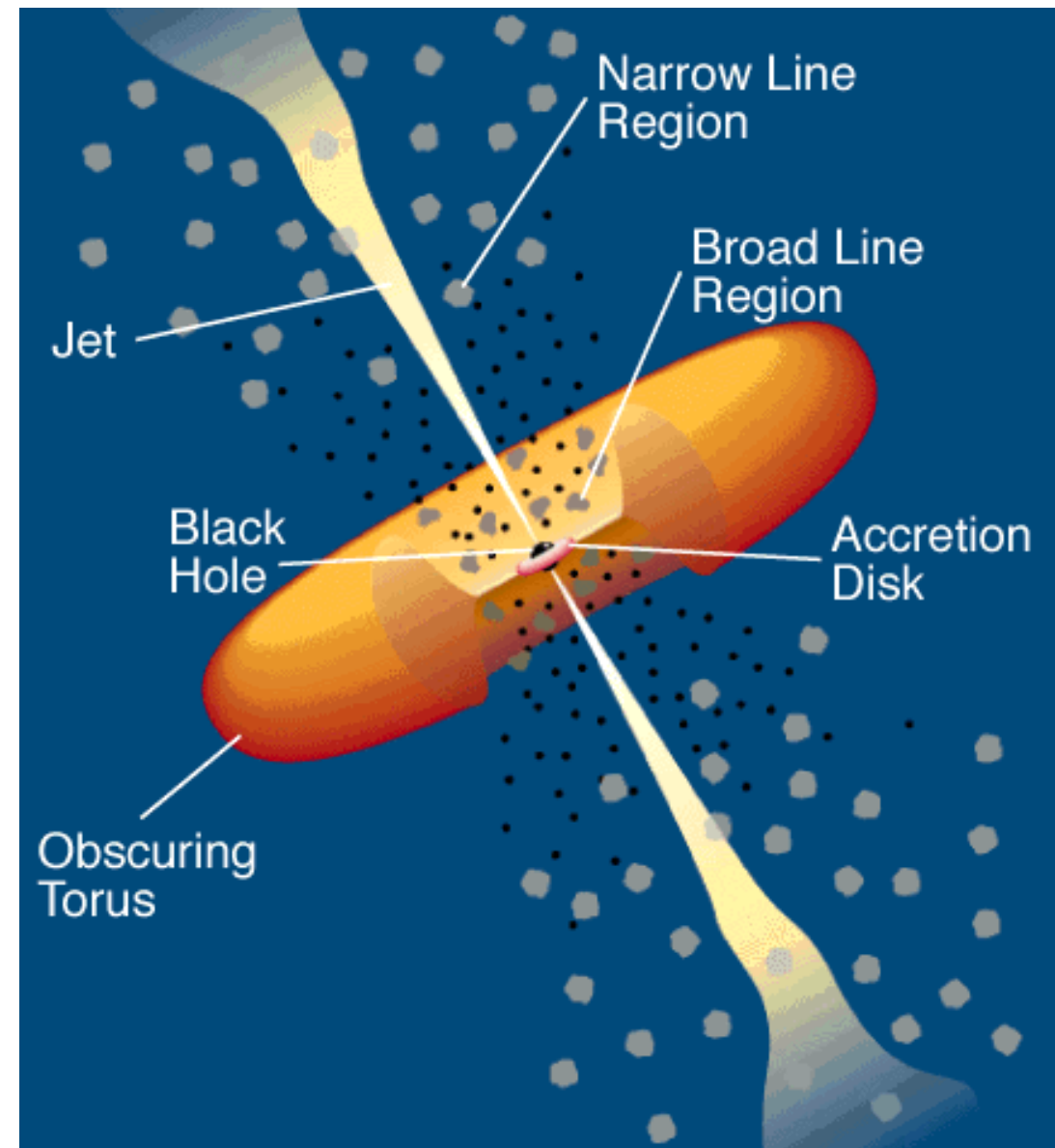
Aktive Galaktische Kerne (AGN)

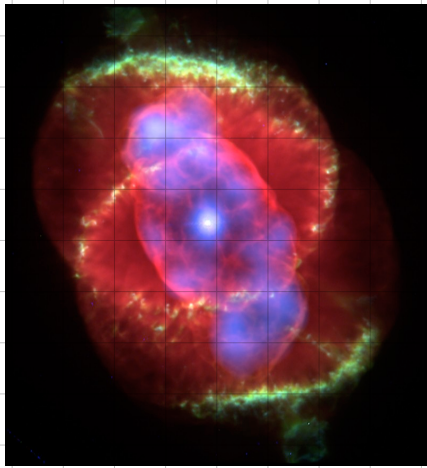
Seyfert-Galaxien, Quasare, Blazare

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Seyfert-Galaxien, Quasare, Blazare

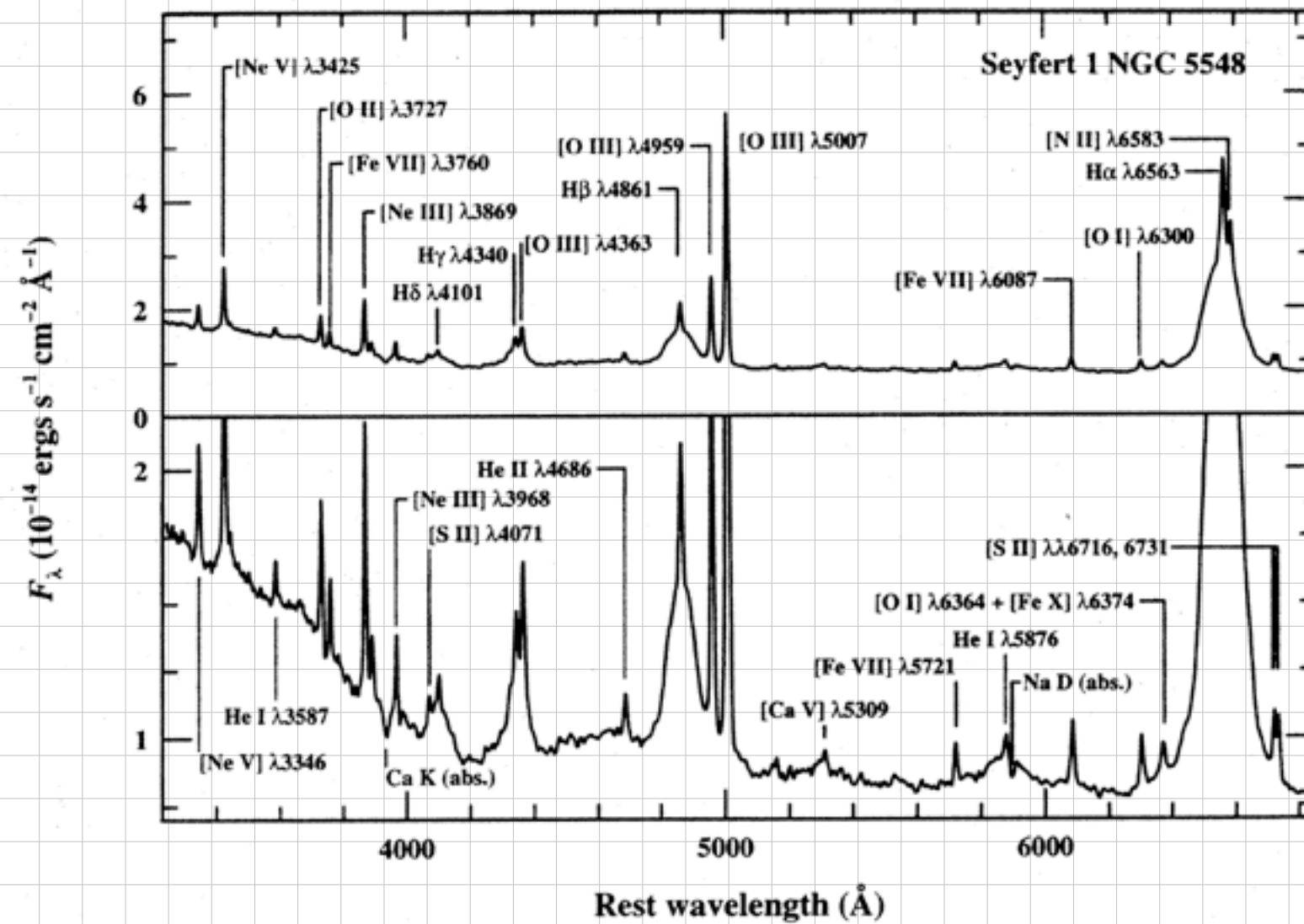
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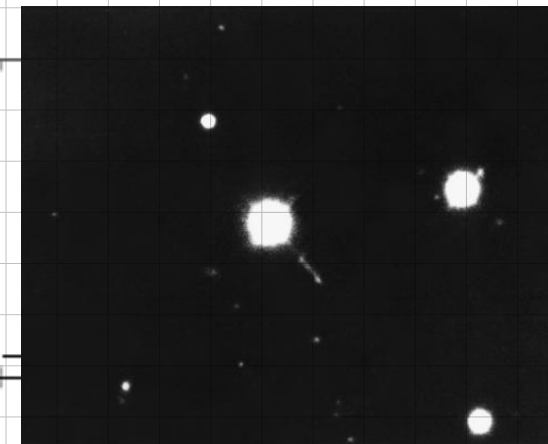
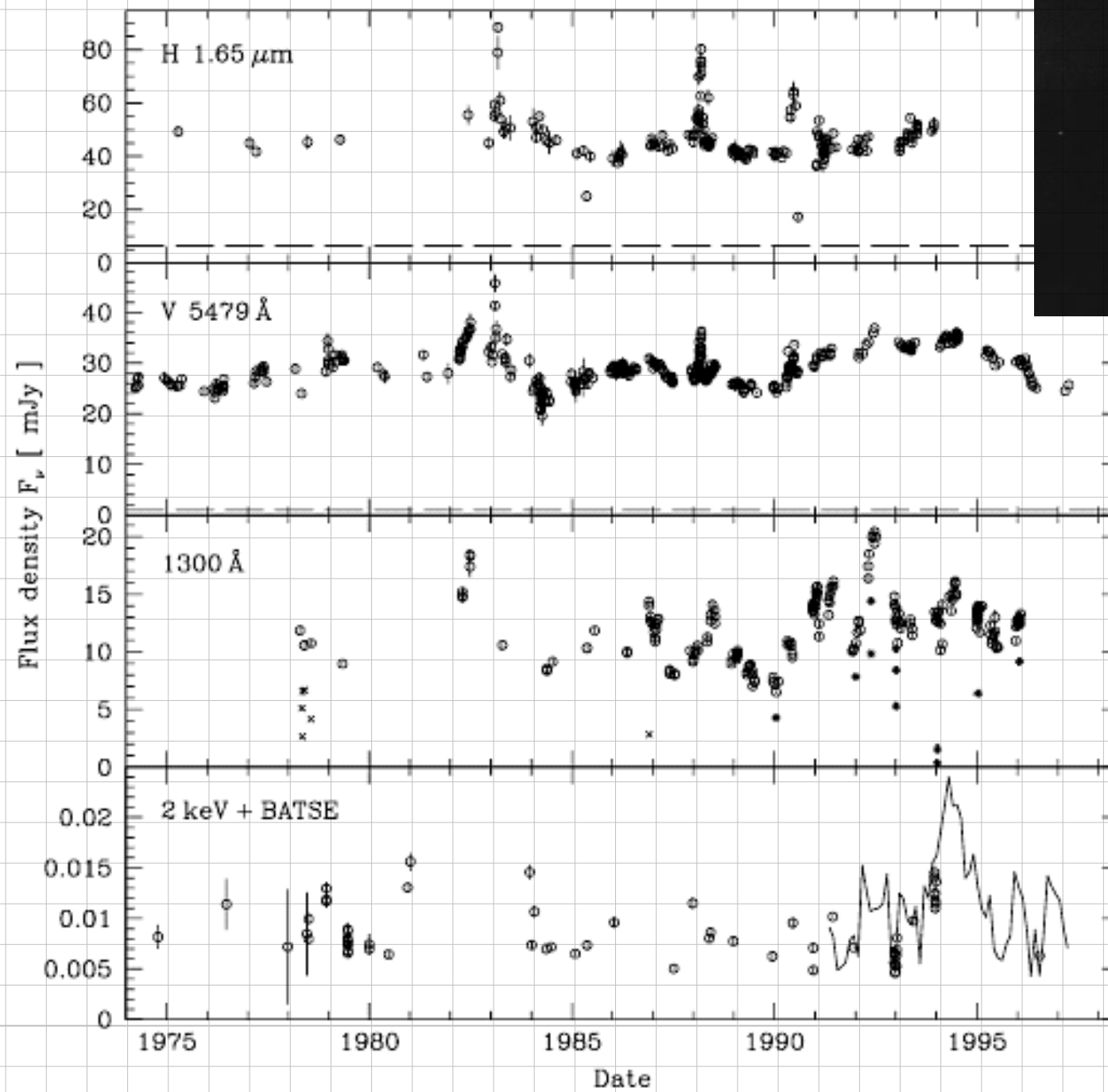


Seyfert-Galaxien

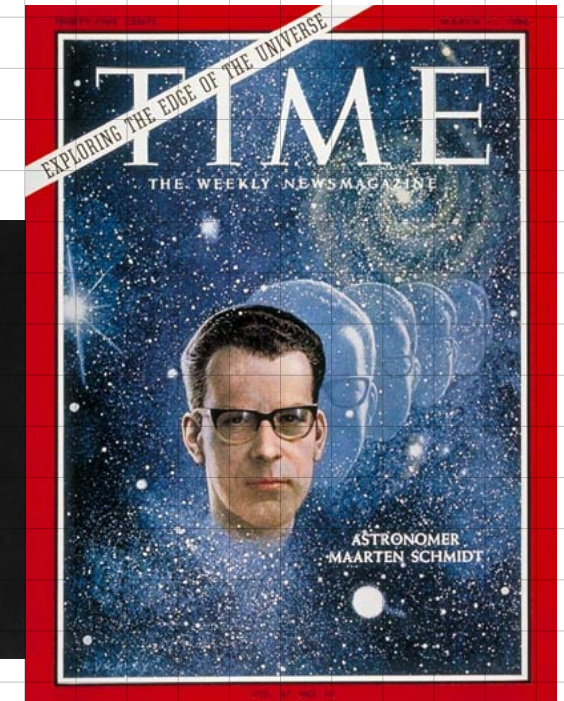
Entdeckung: 1908, Fath & Slipher



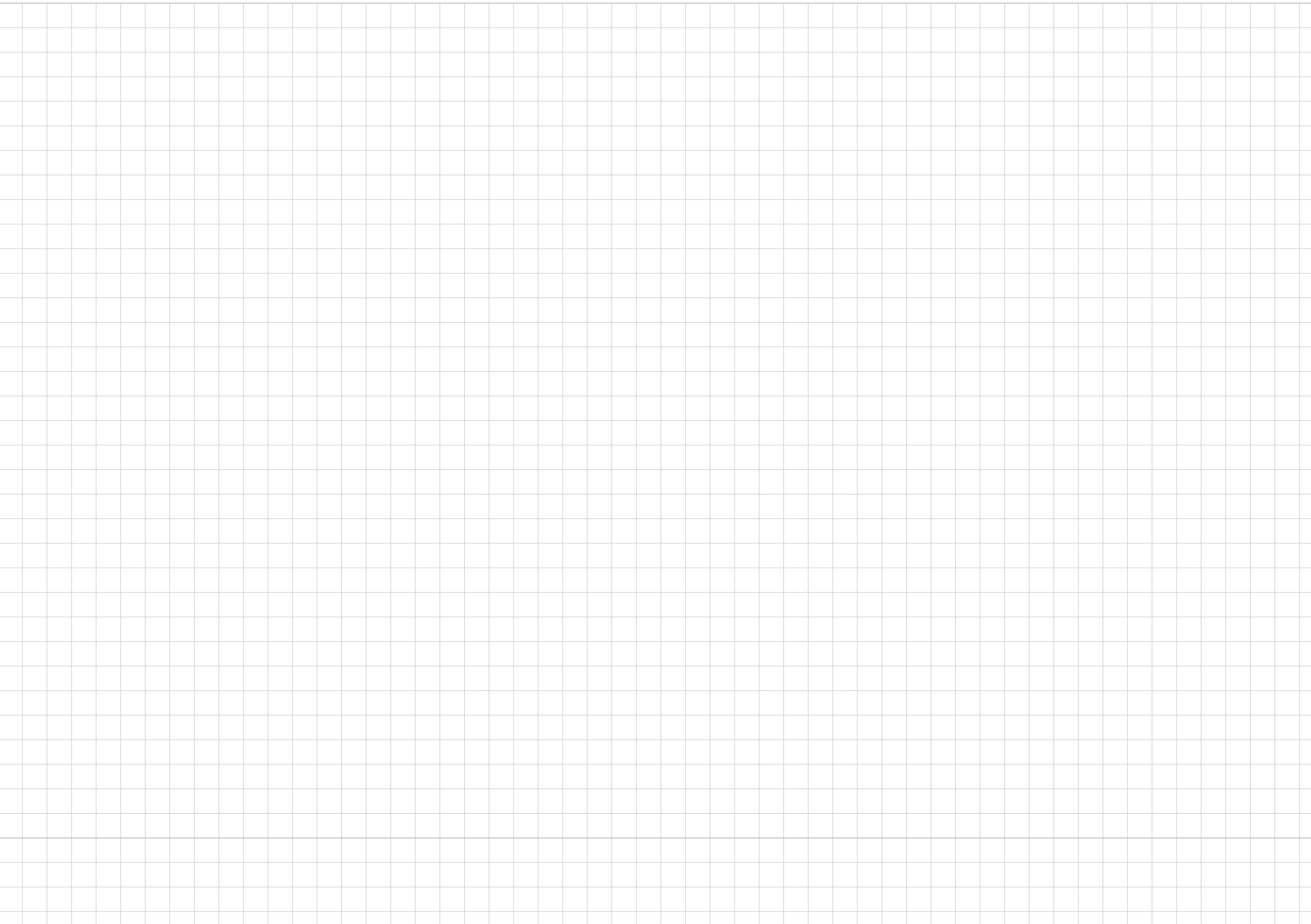
Quasare



3C 273



(Maarten Schmidt, 1964)



QUASAR-Eigenschaften

