

Modellierung des Gammastrahlungsspektrums von SNR RX J1713.7-3946



ecap

ERLANGEN CENTRE
FOR ASTROPARTICLE
PHYSICS

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Gliederung

H.E.S.S.

RX J1713.7-3946

Modellierung

Gliederung

H.E.S.S.

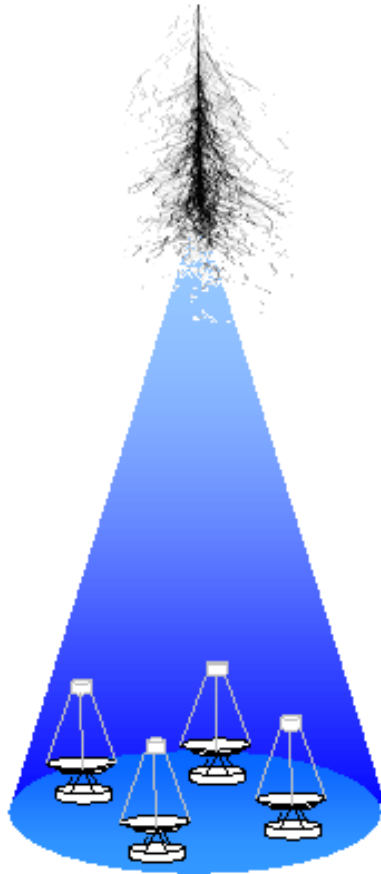
RX J1713.7-3946

Modellierung

H.E.S.S. (High Energy Stereoscopic System)



H.E.S.S. (High Energy Stereoscopic System)



- (noch) 4 IACTs (Imaging Air Cerenkov Telescopes)
- Energieschwelle ~ 100 GeV
- seit 2002
- Namibia
- benannt nach Victor Hess

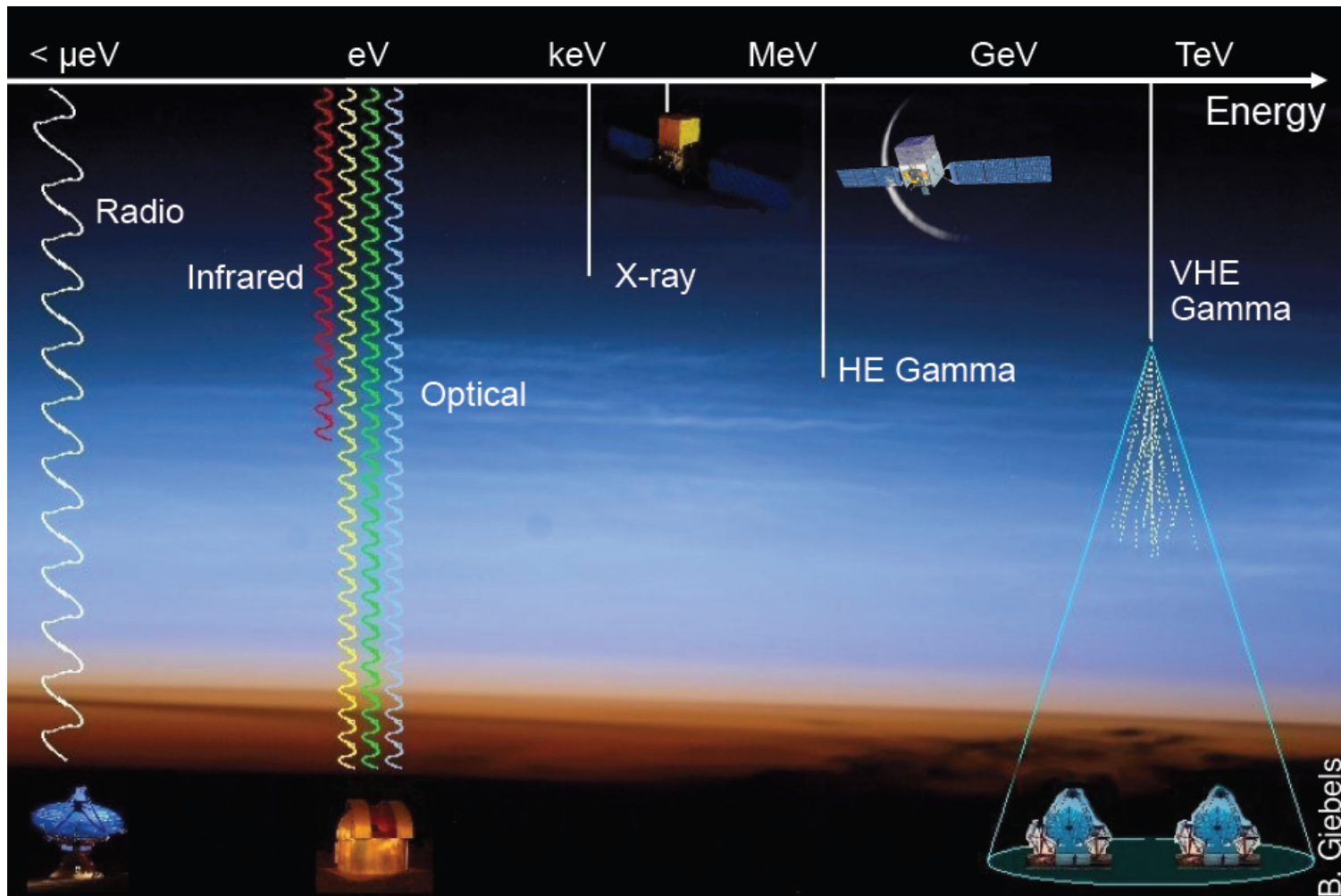
Gliederung

H.E.S.S.

RX J1713.7-3946

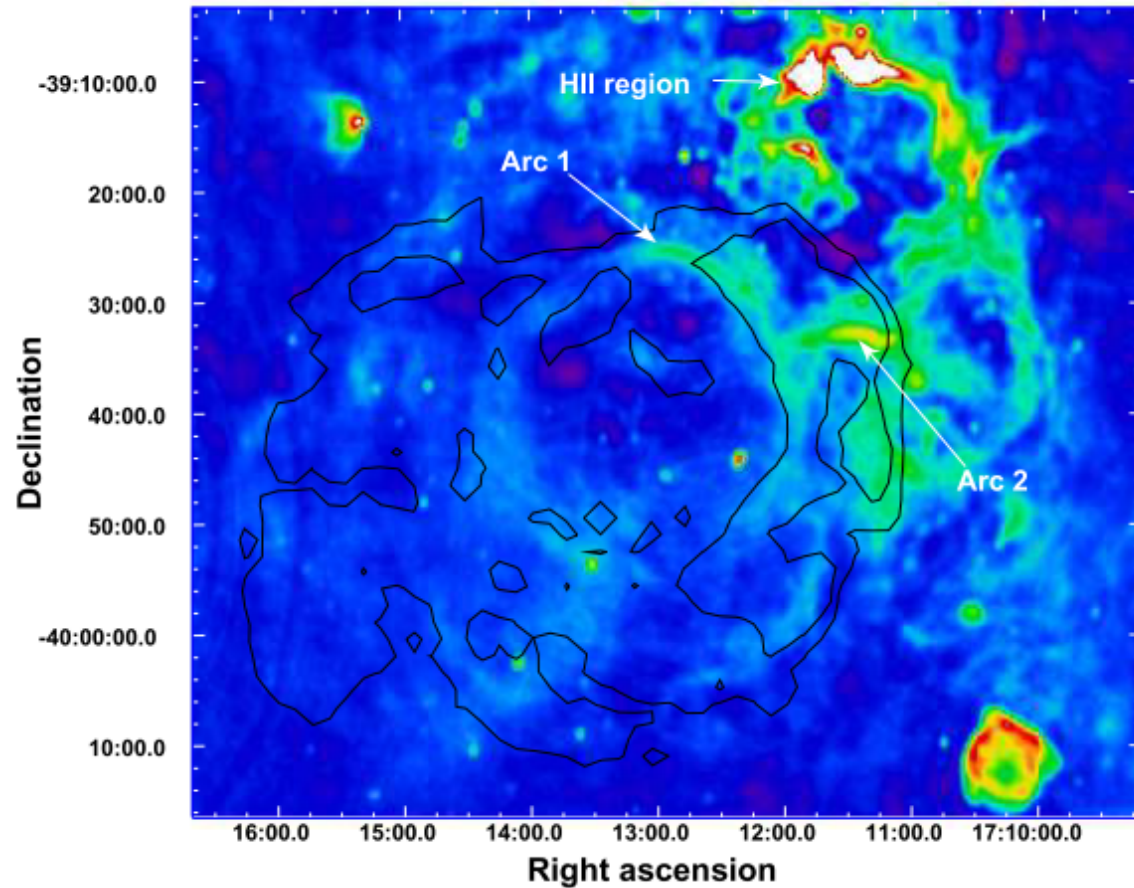
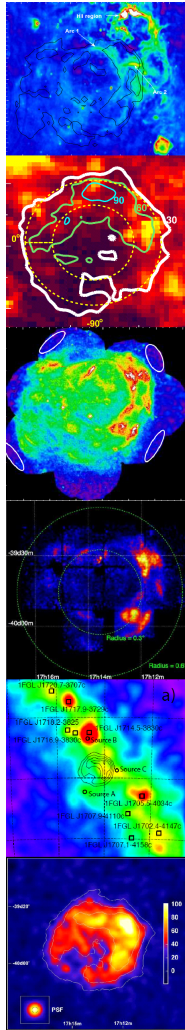
Modellierung





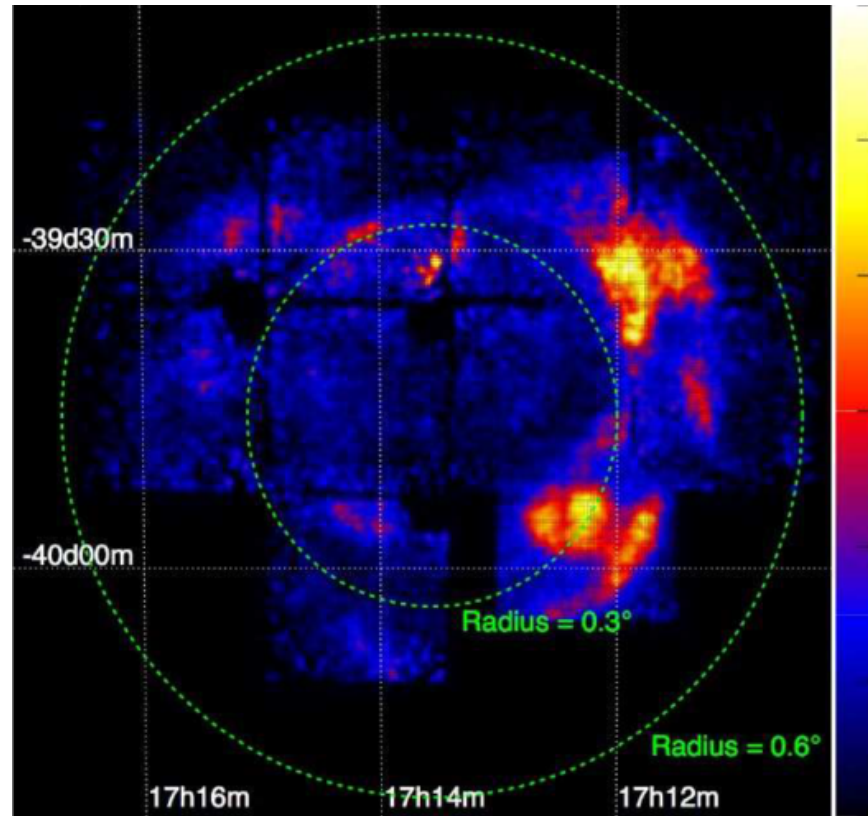
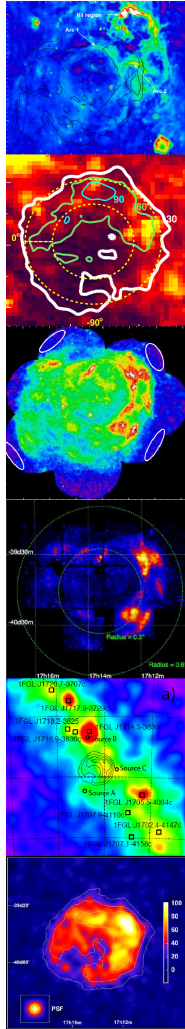
Elektromagnetisches Spektrum und Beobachtungsinstrumente [Giebels, B.]

RX J1713.7-3946 Skymaps in Multiwellenlängen



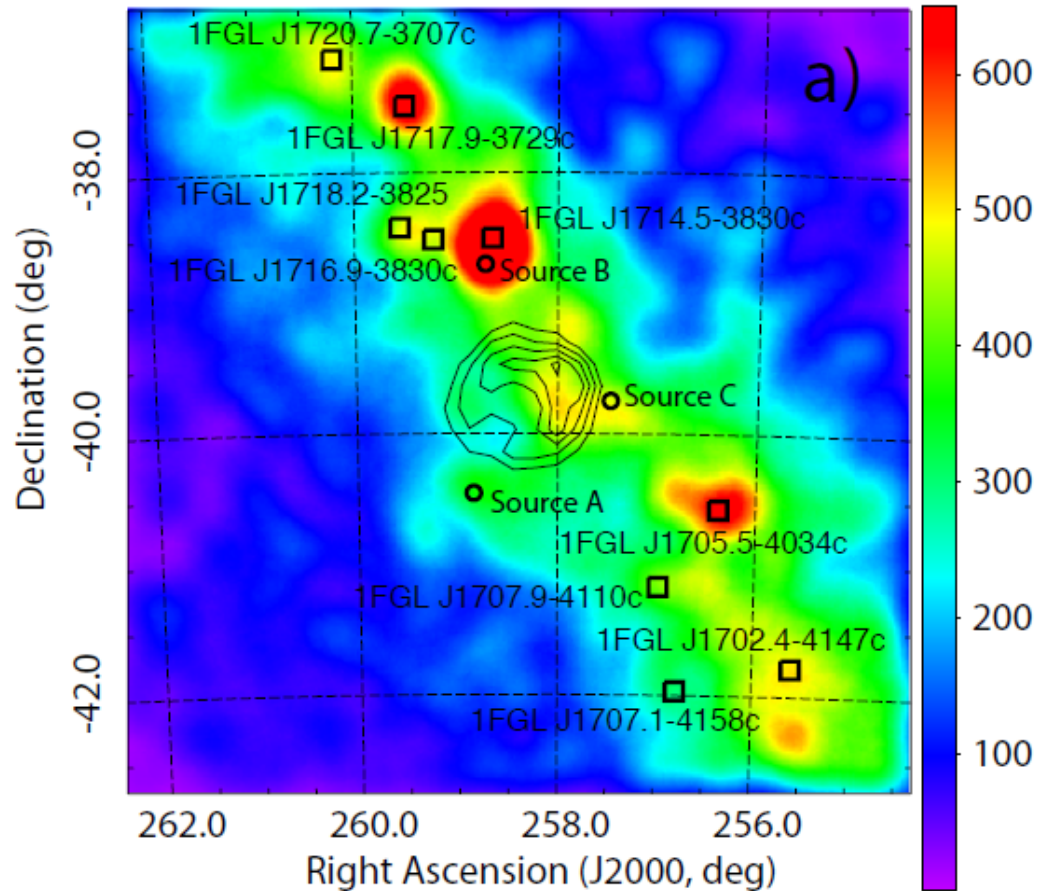
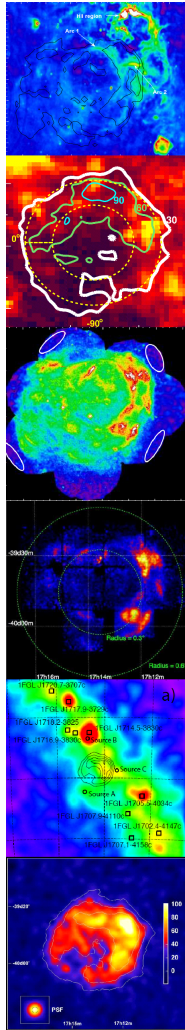
ATCA (1,4 GHz) [Lazendic *et al.* (2004)]

RX J1713.7-3946 Skymaps in Multiwellenlängen



Suzaku [Tanaka *et al.* (2008)]

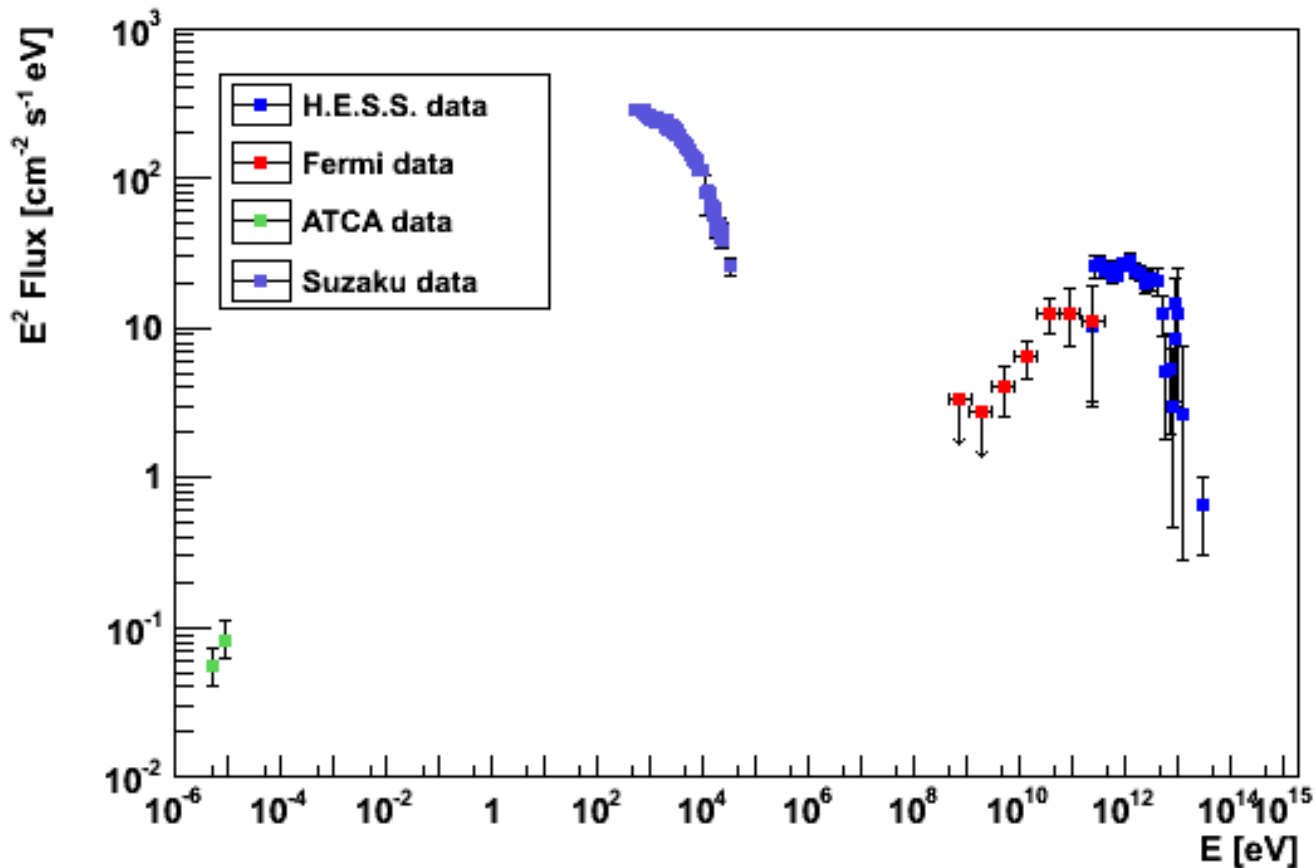
RX J1713.7-3946 Skymaps in Multiwellenlängen



Fermi (> 3 GeV) [Abdo *et al.* (2011)]

SED von RX J1713.7-3946

Messwerte



ATCA (Radio), Suzaku (X-ray), Fermi und H.E.S.S. (Gamma)

Gliederung

H.E.S.S.

RX J1713.7-3946

Modellierung

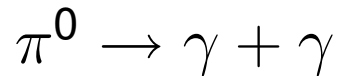


Beschleunigungsmechanismen

Beschleunigungsmechanismen

hadronisch

z.B. π^0 -Zerfall



leptonisch

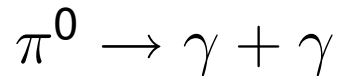
z.B. IC,
Synchrotronstrahlung

Beschleunigungsmechanismen

Beschleunigungsmechanismen

hadronisch

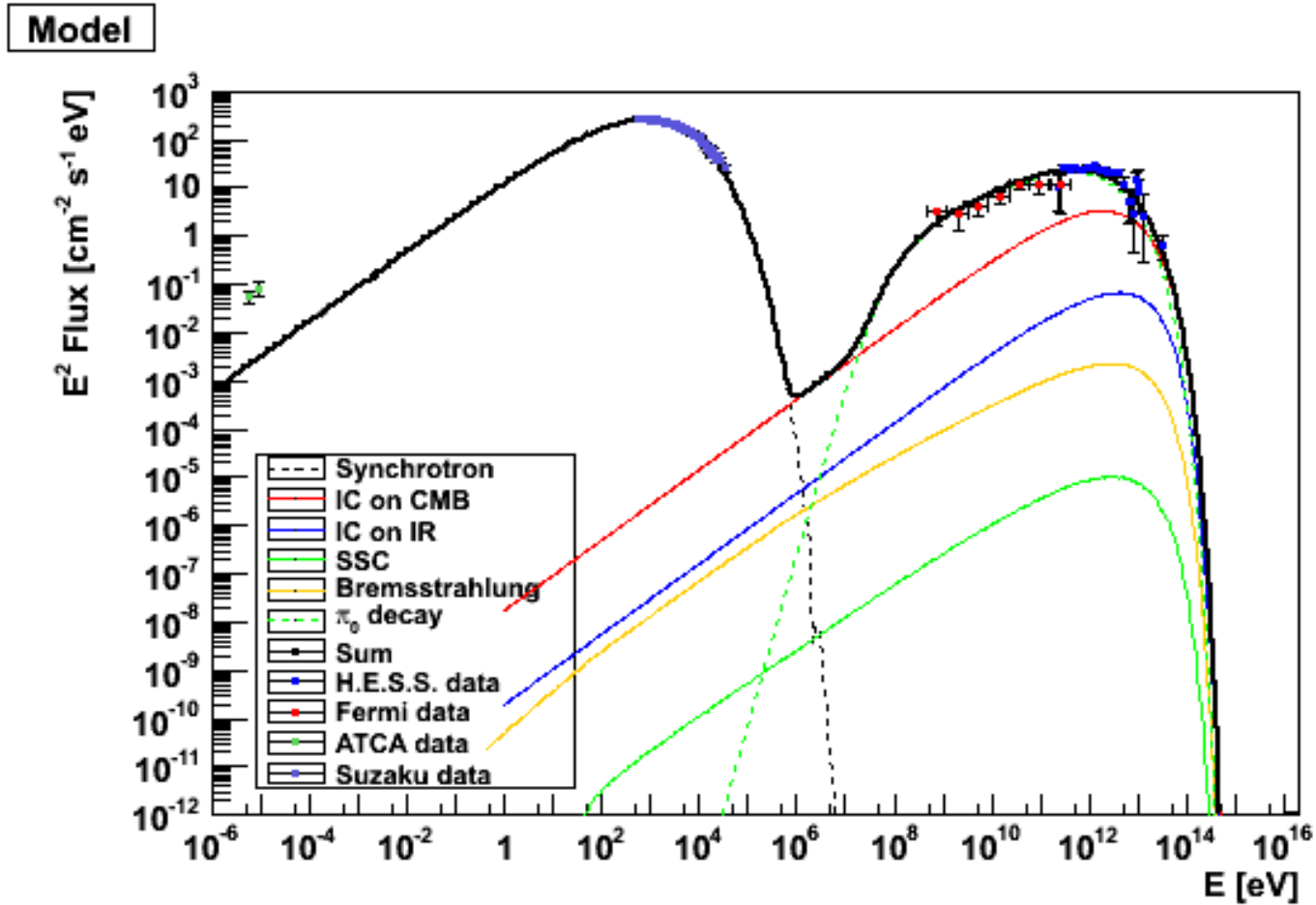
z.B. π^0 -Zerfall



leptonisch

z.B. IC,
Synchrotronstrahlung

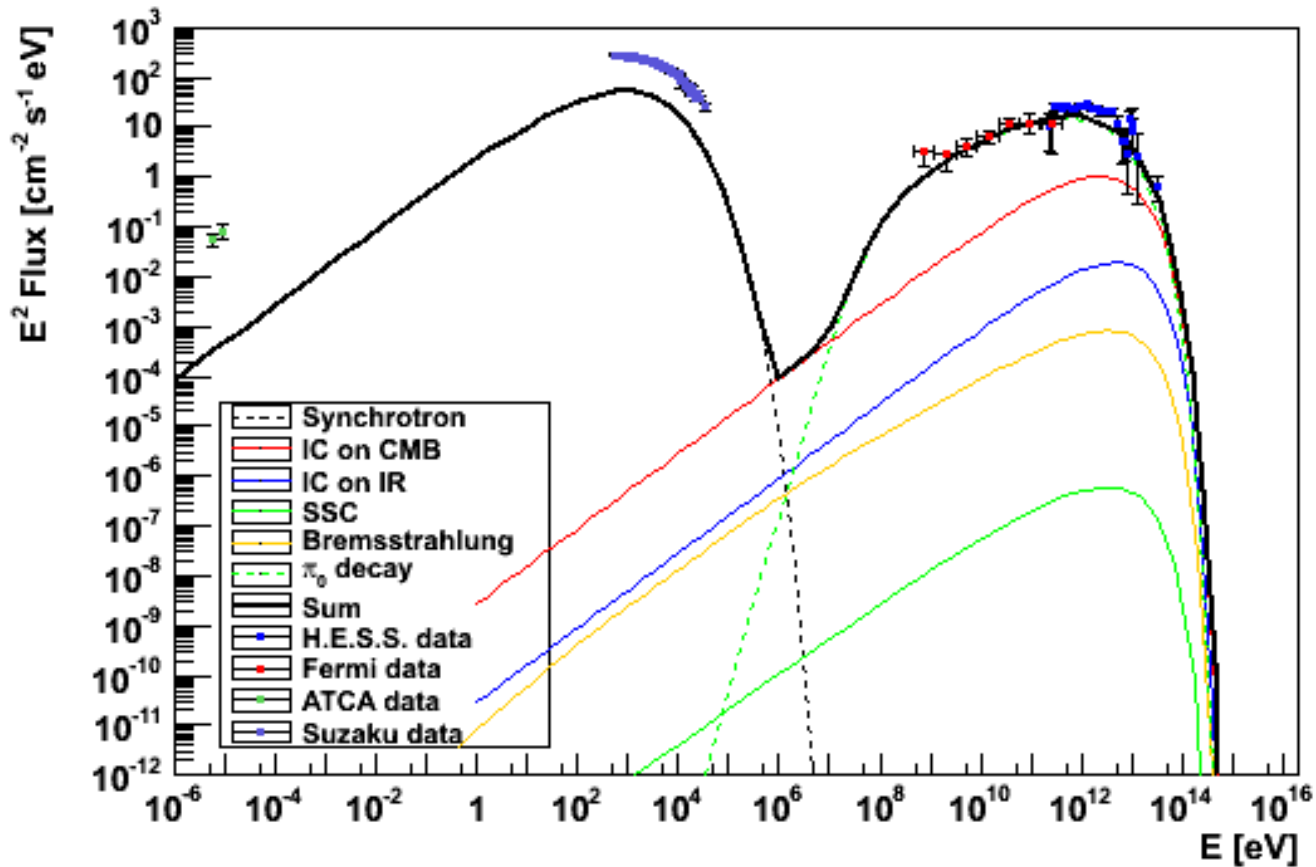
Hadronisches One-Zone-Model für RX J1713.7-3946



SED mit Messwerten und One-Zone-Model

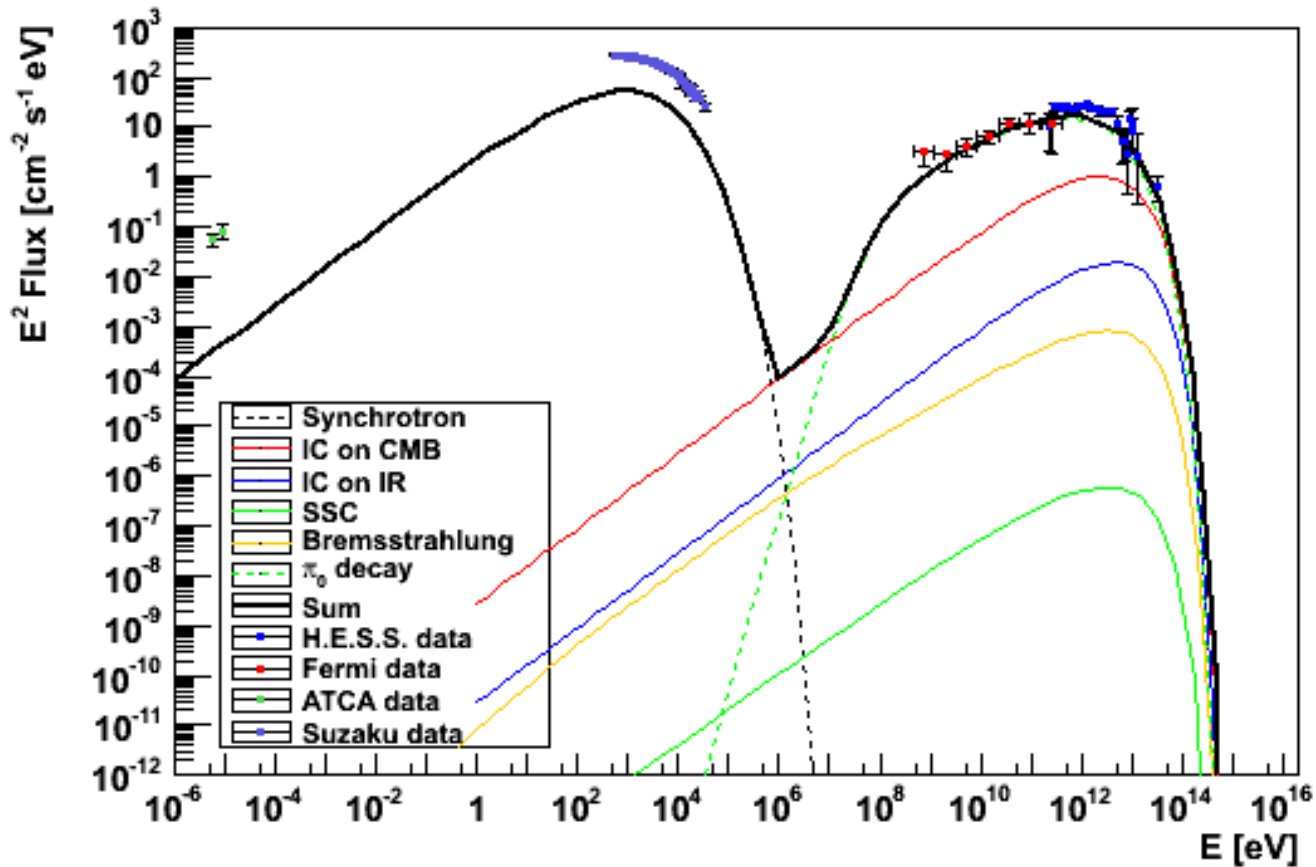
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $20 \mu\text{G}$



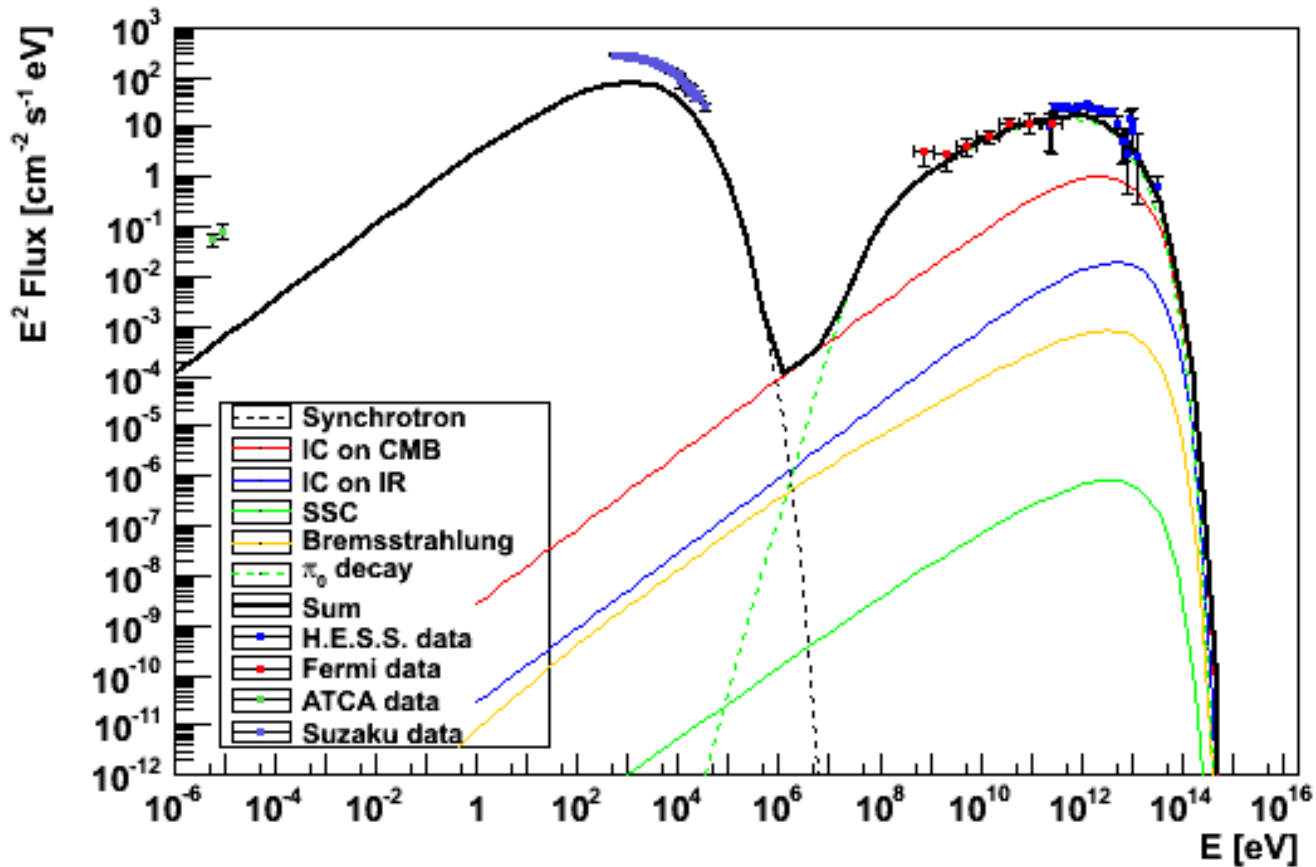
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $20 \mu\text{G}$



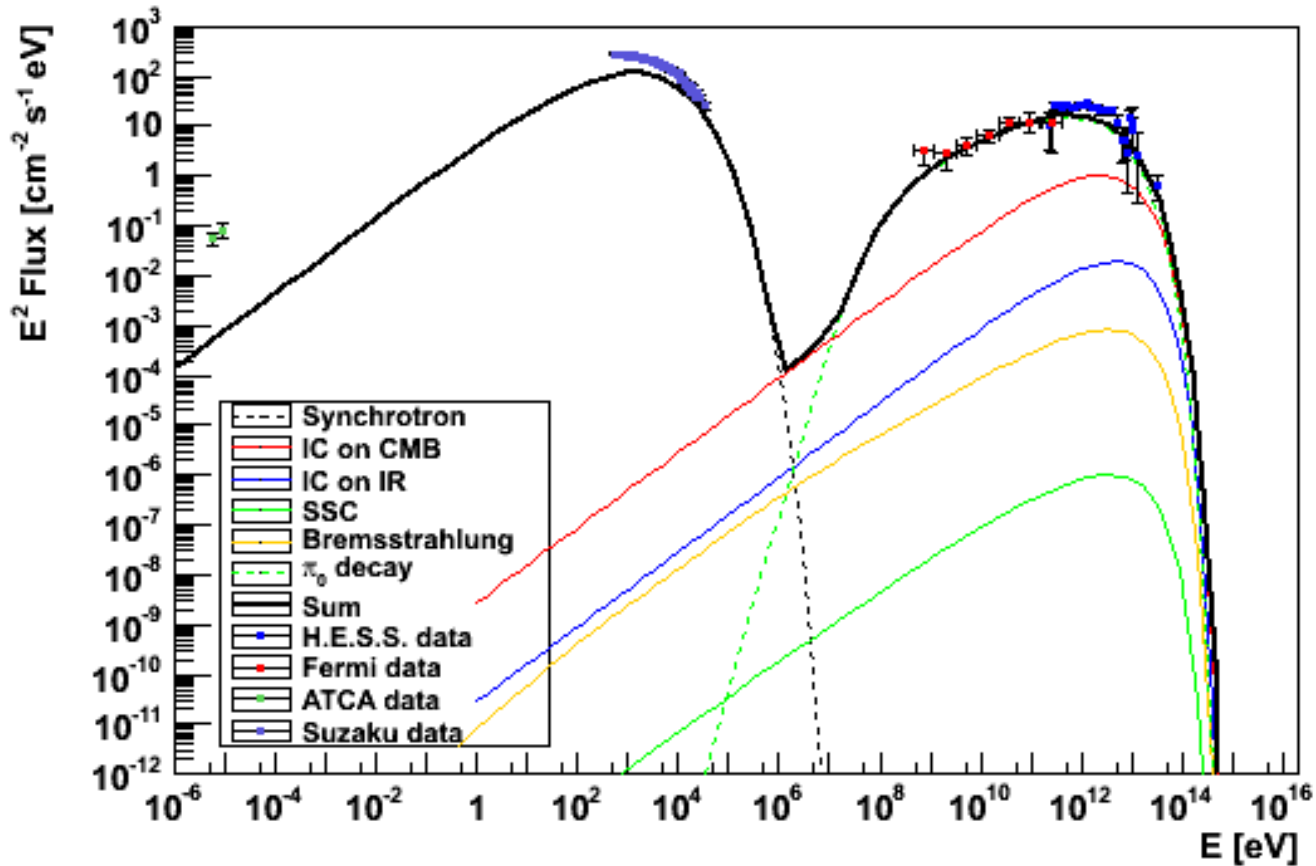
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $25 \mu\text{G}$



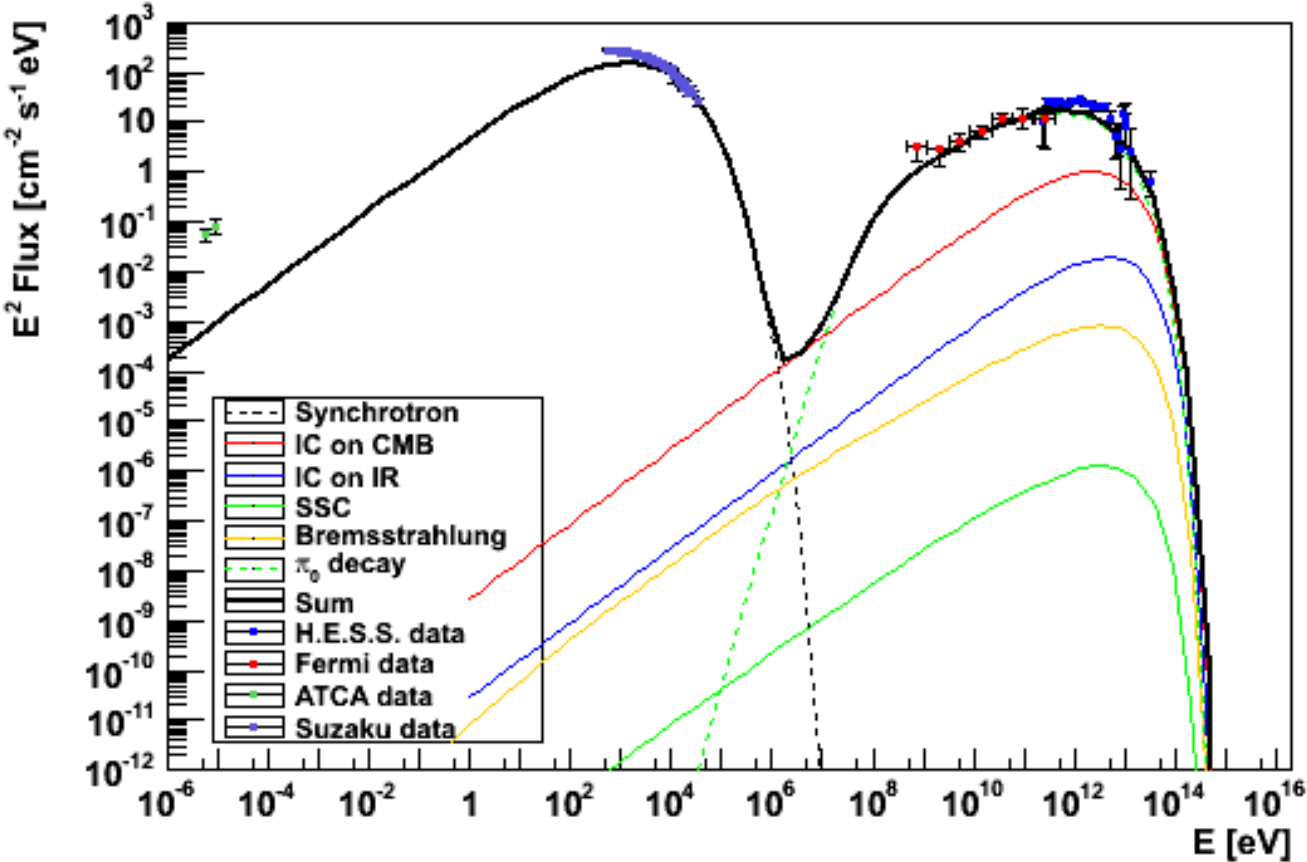
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $30 \mu\text{G}$



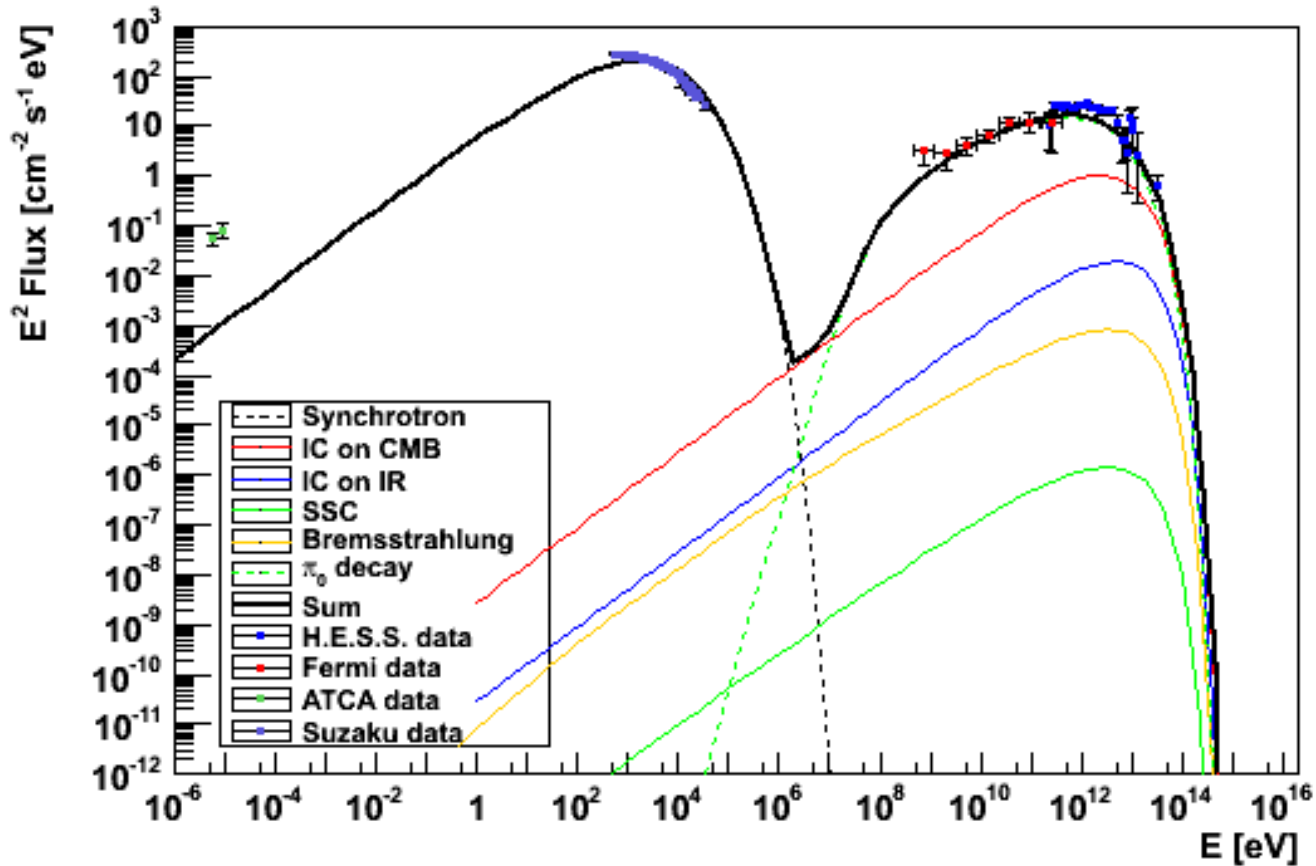
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $35 \mu\text{G}$



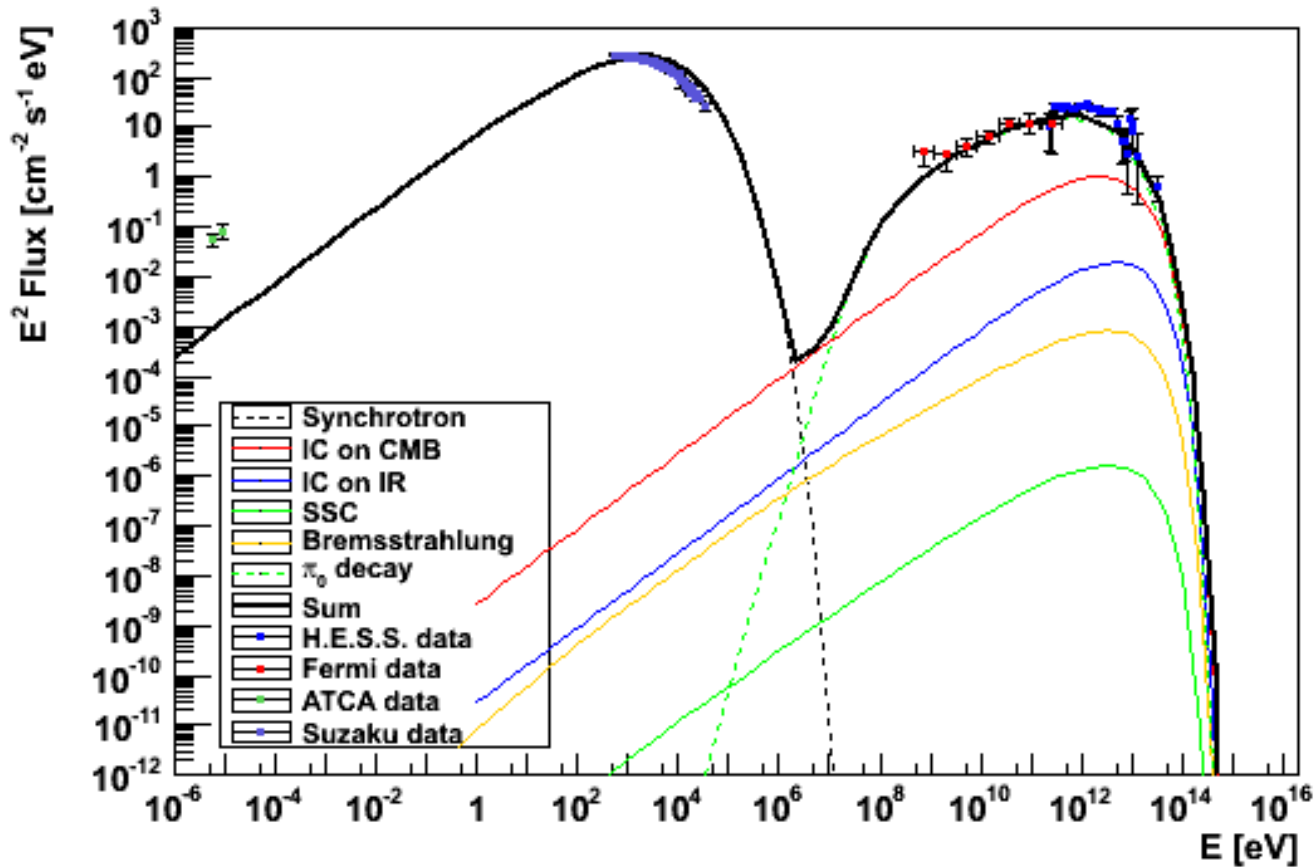
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $40 \mu\text{G}$



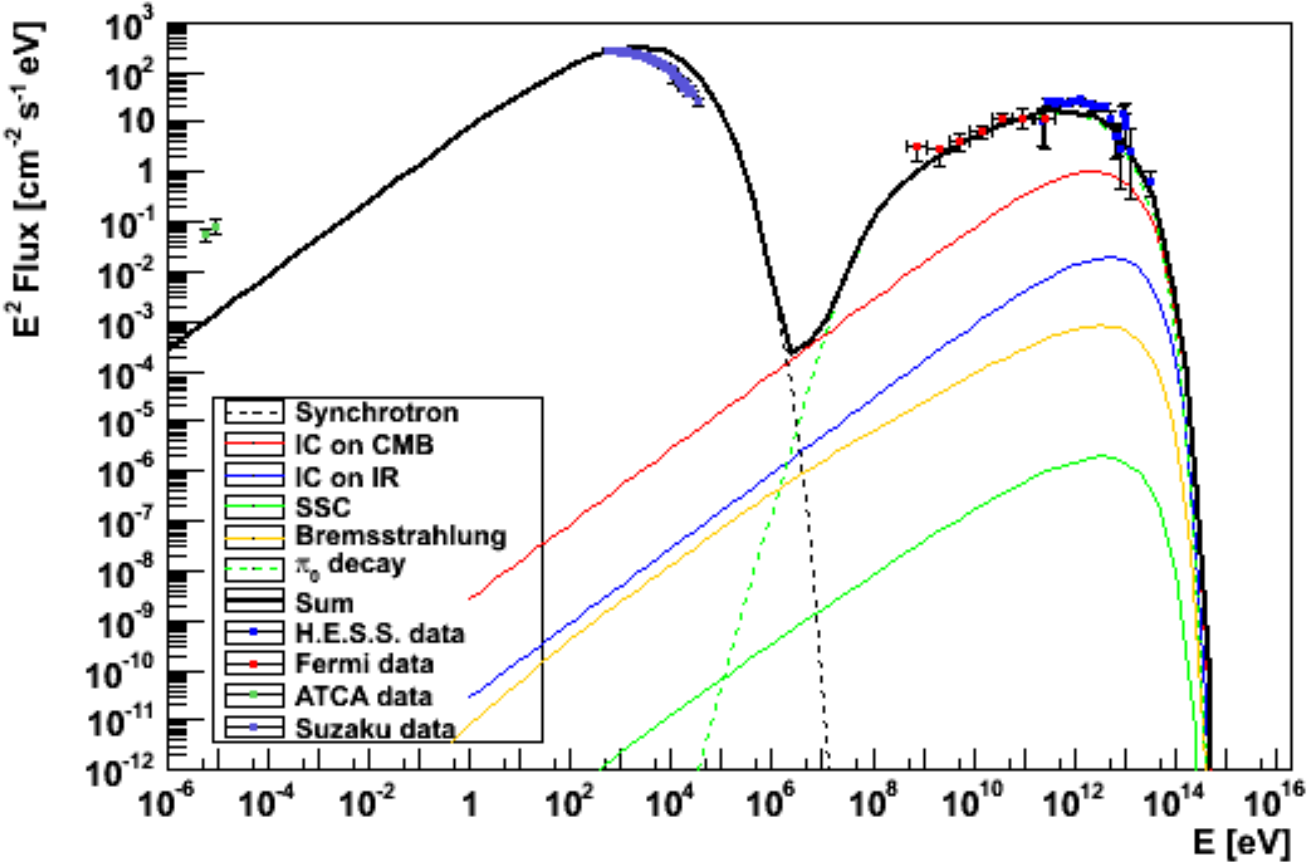
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $45 \mu\text{G}$



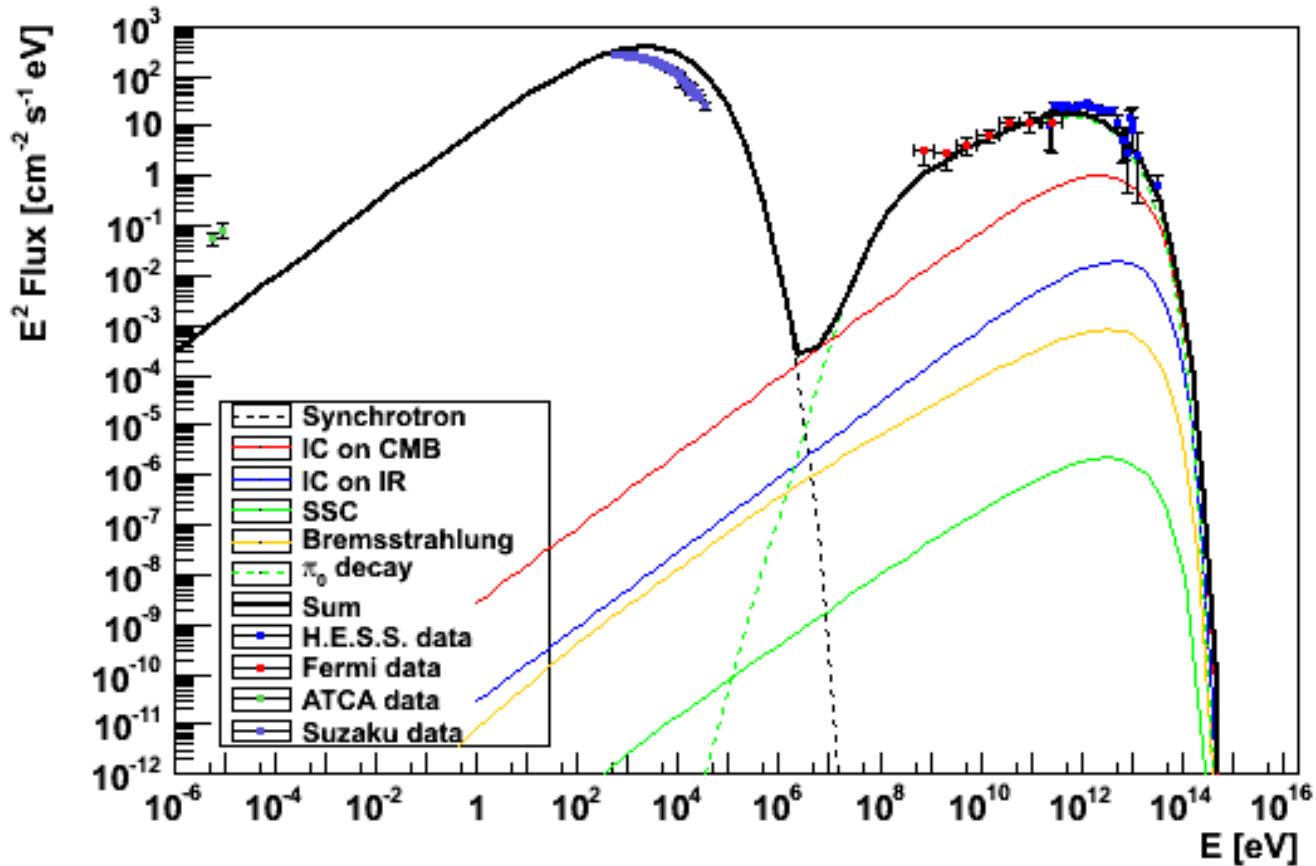
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $50 \mu\text{G}$



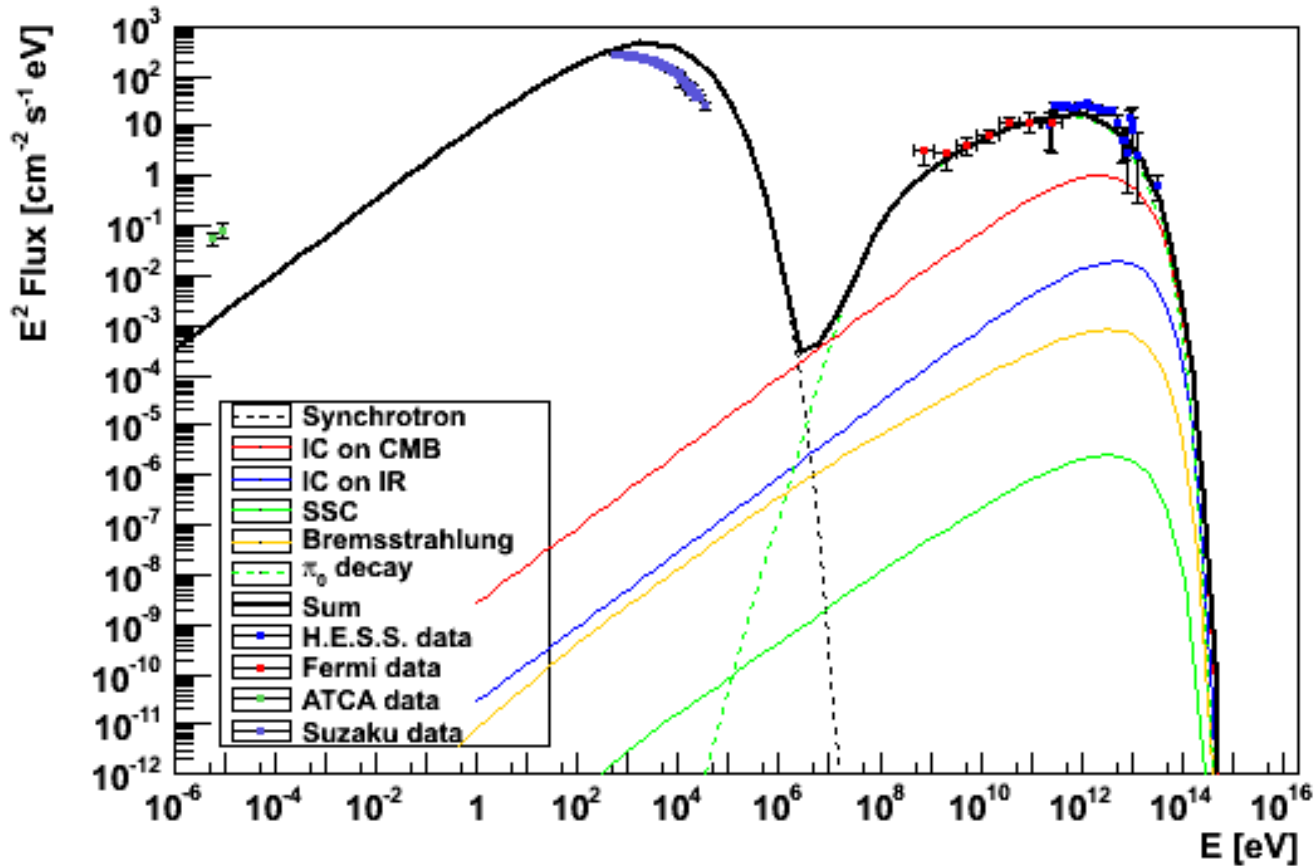
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $55 \mu\text{G}$



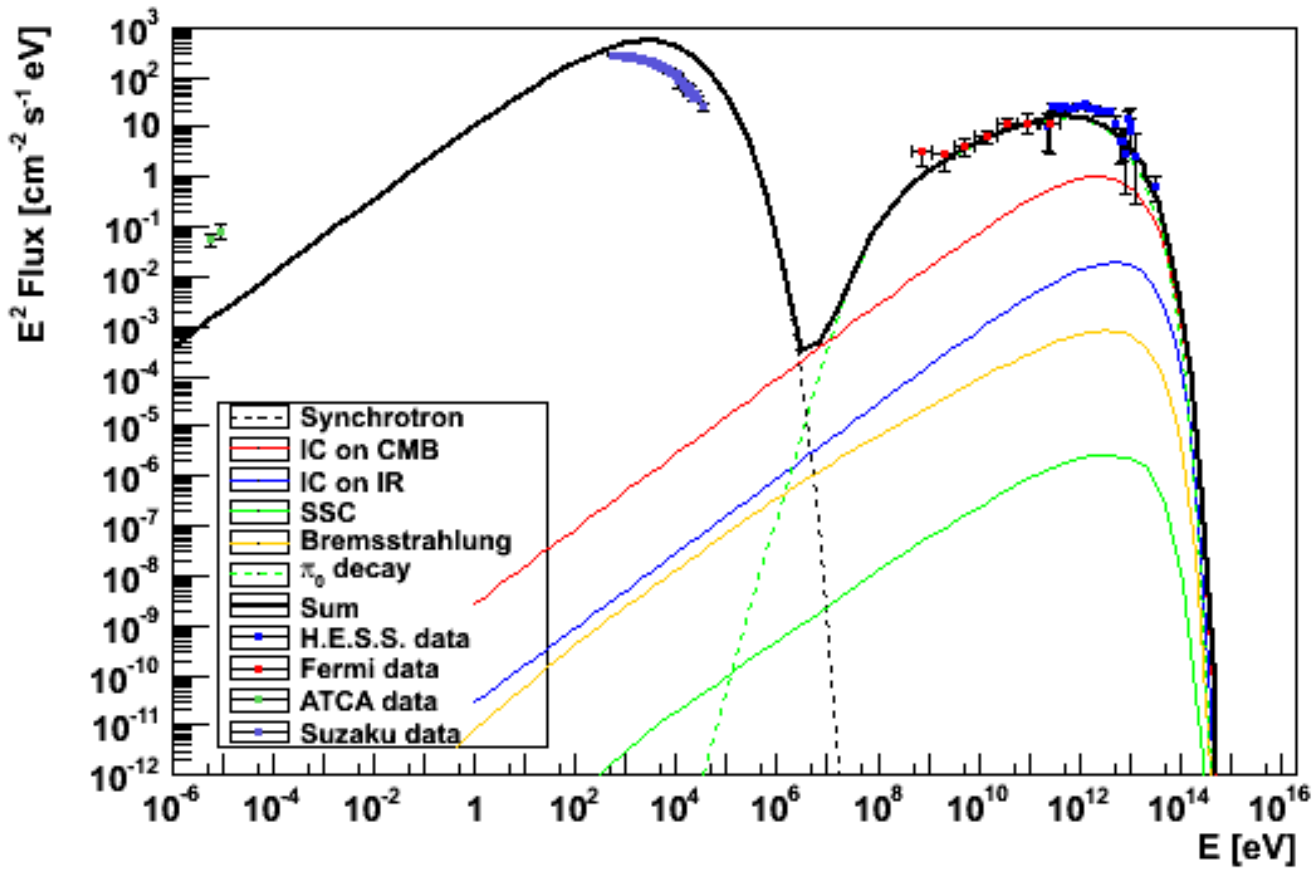
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $60 \mu\text{G}$



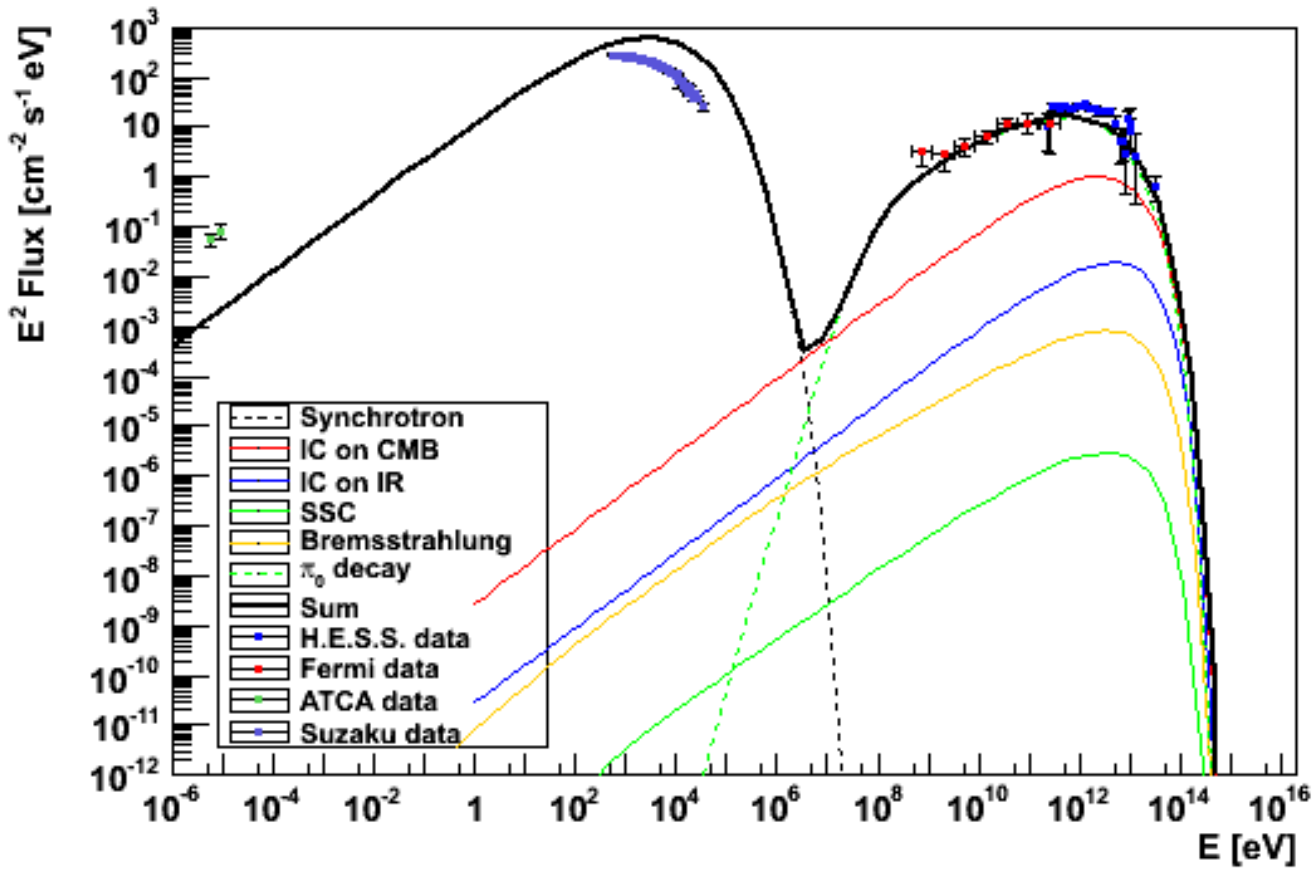
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $65 \mu\text{G}$



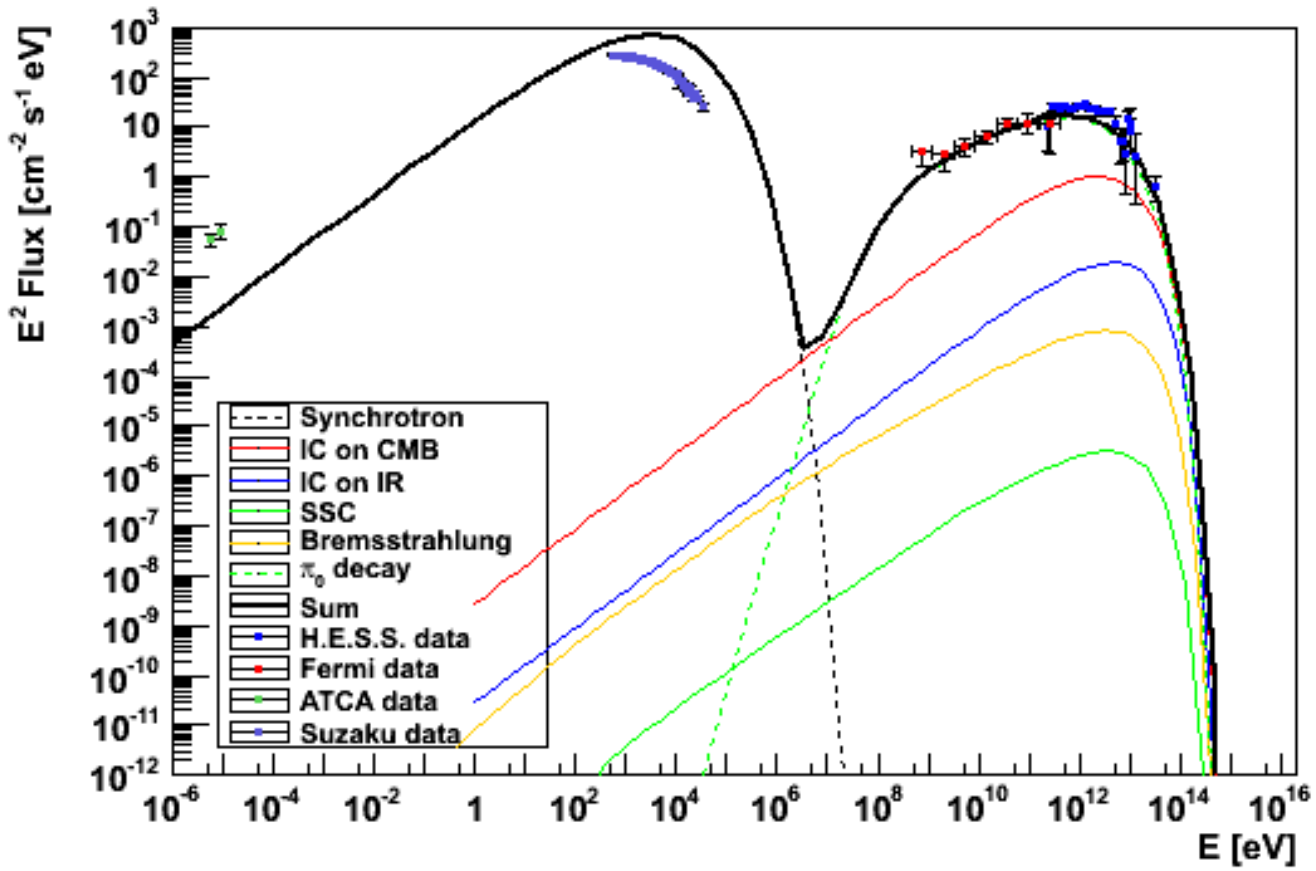
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $70 \mu\text{G}$



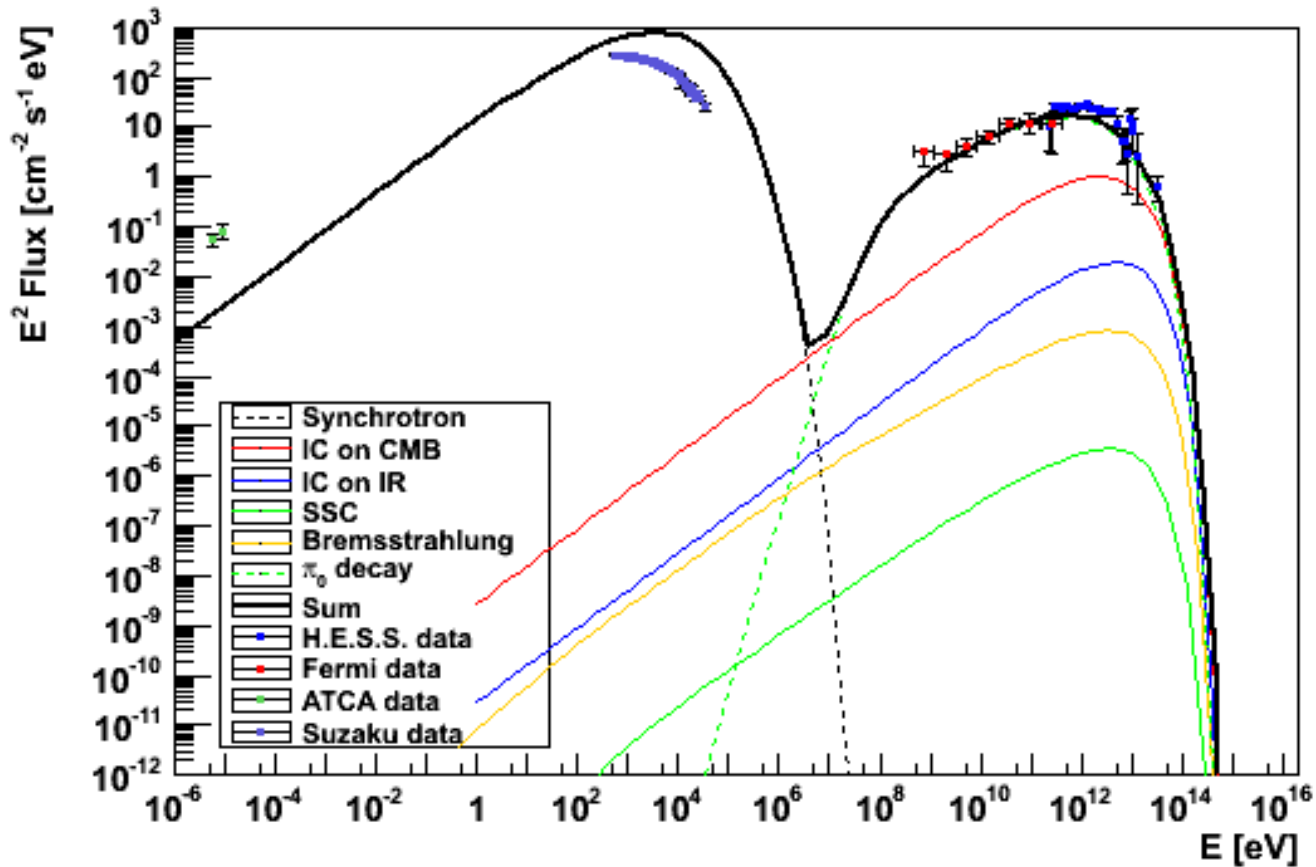
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $75 \mu\text{G}$



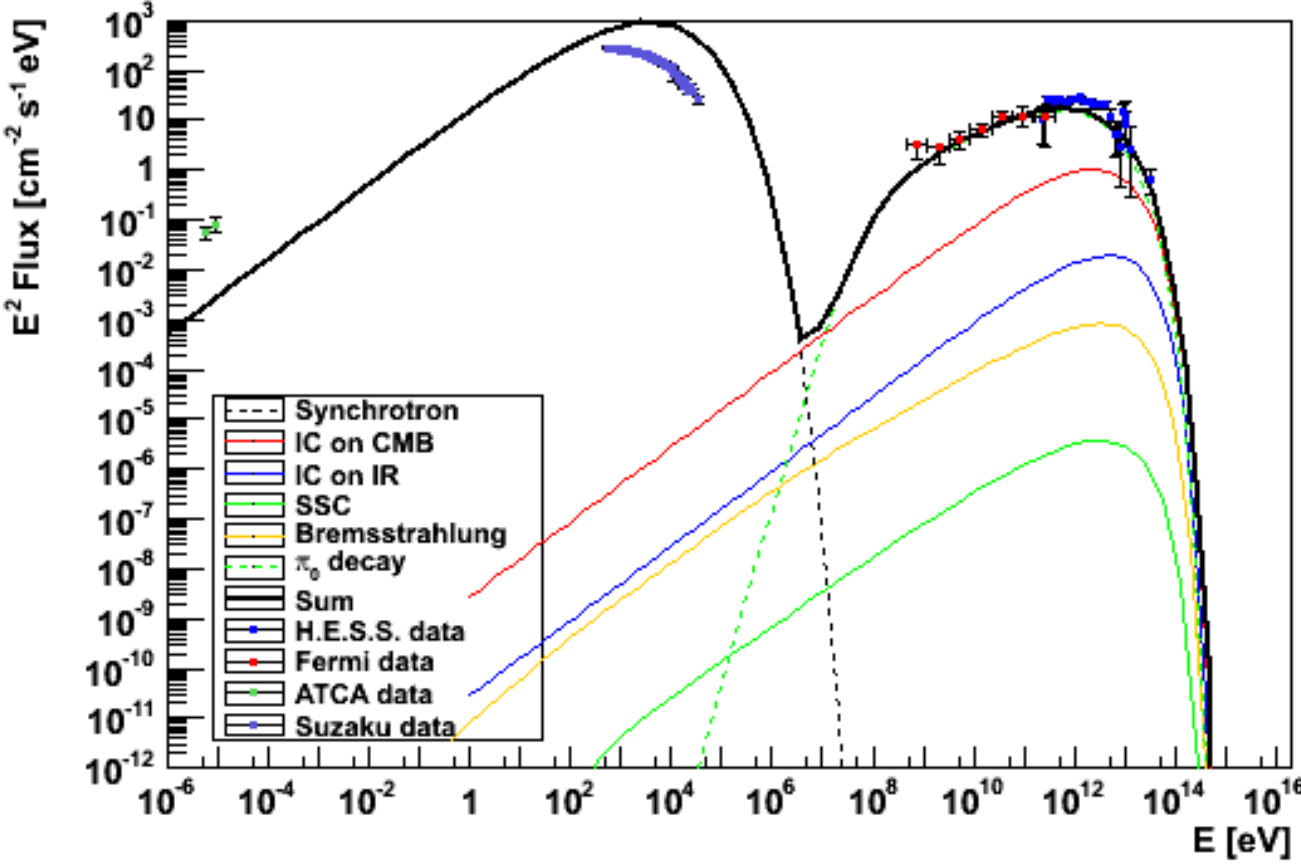
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $80 \mu\text{G}$



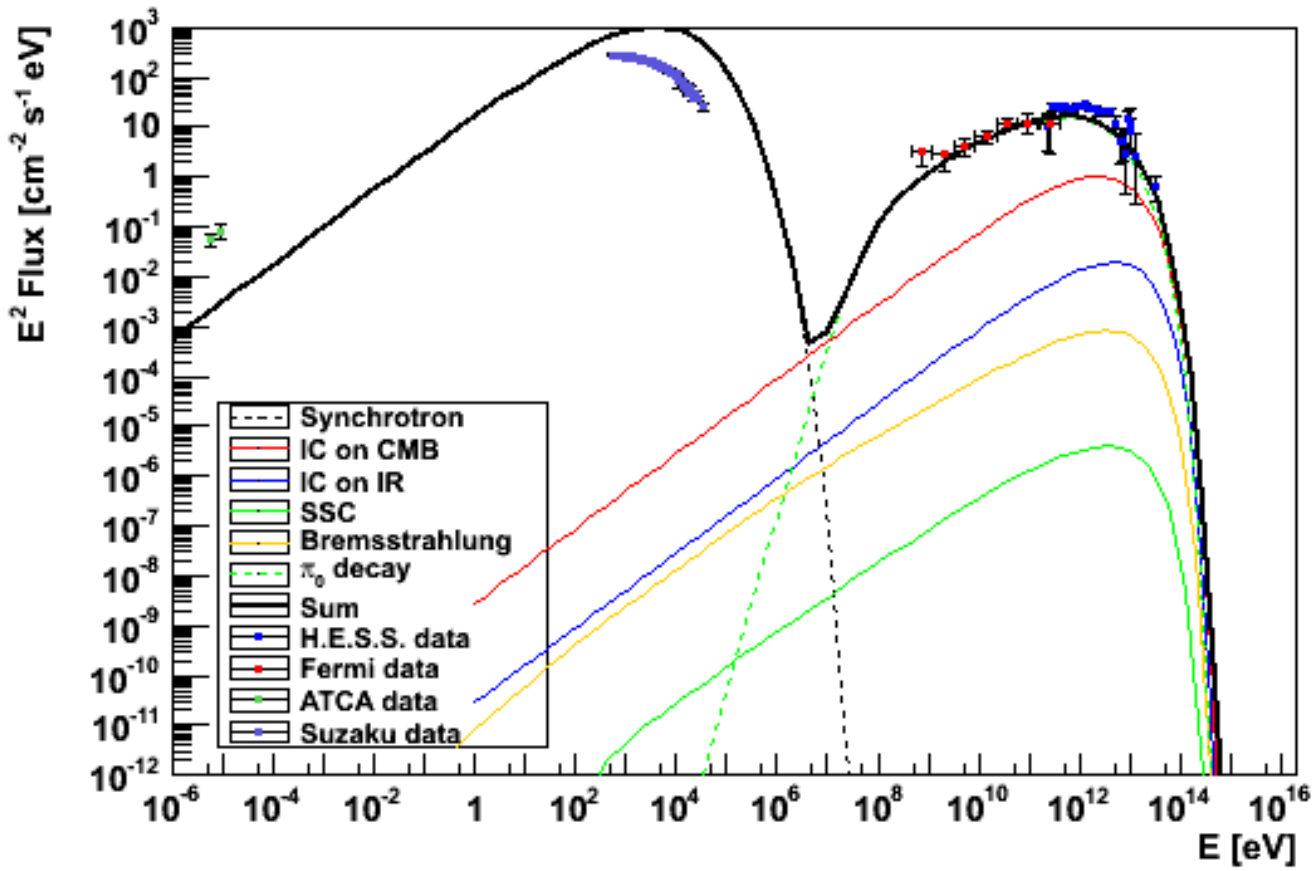
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $85 \mu\text{G}$



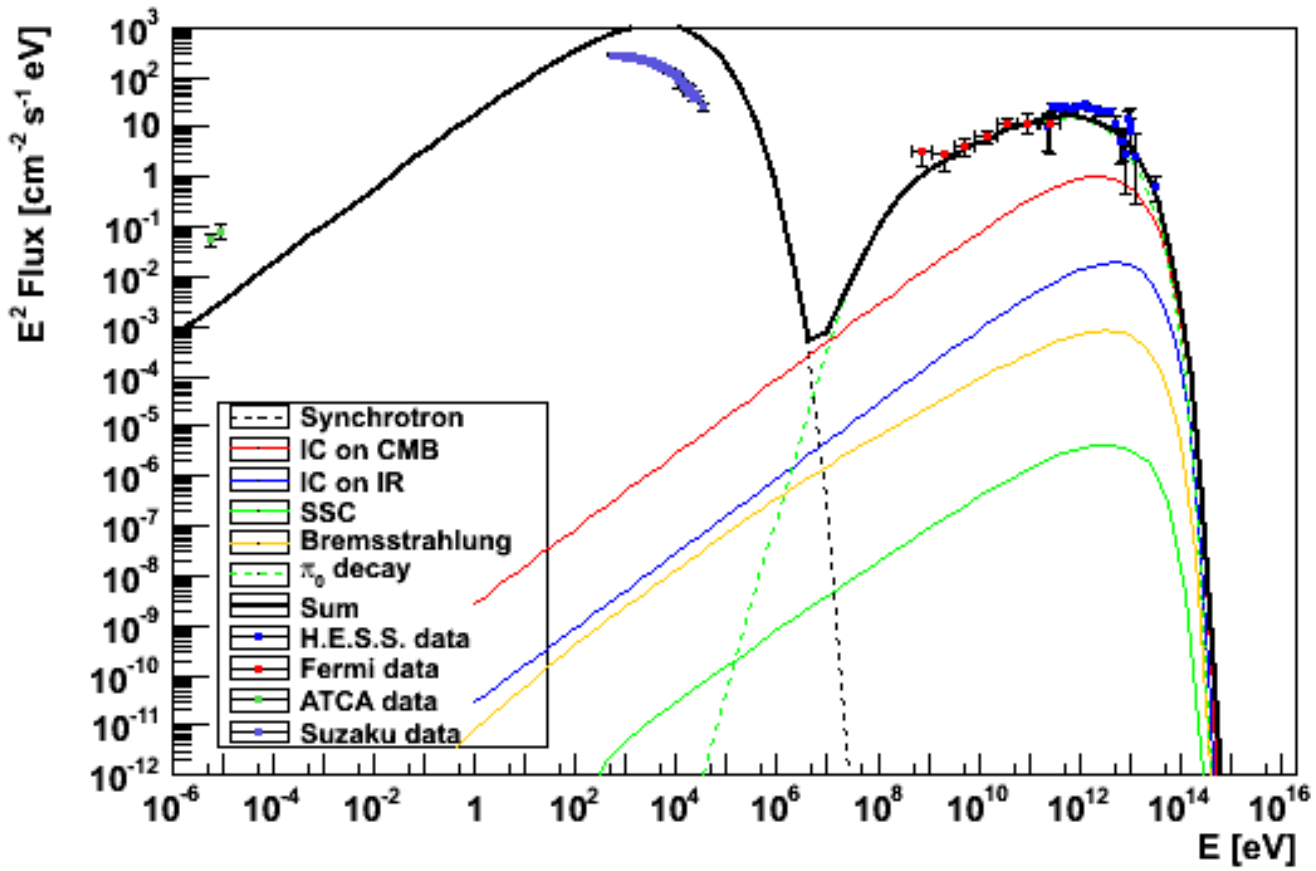
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $90 \mu\text{G}$



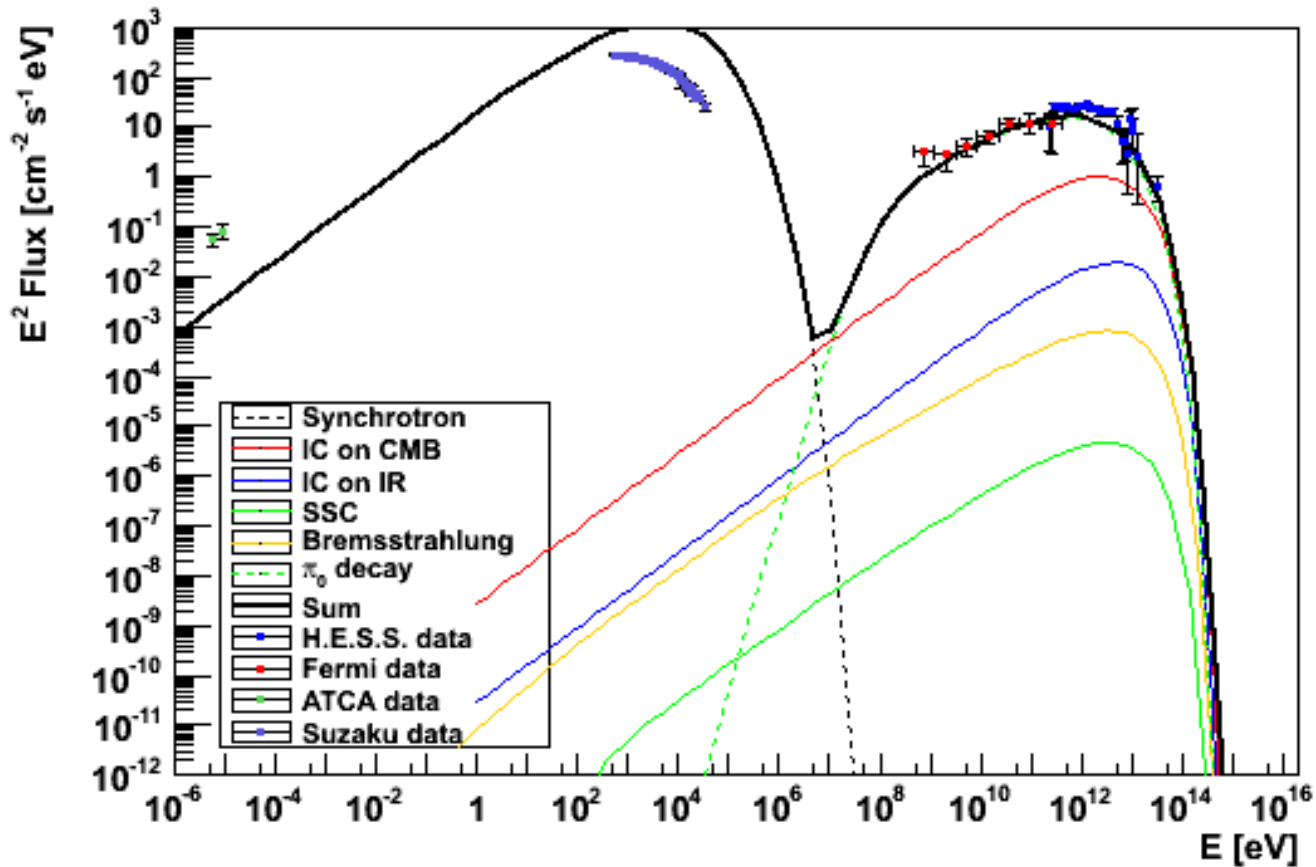
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $95 \mu\text{G}$



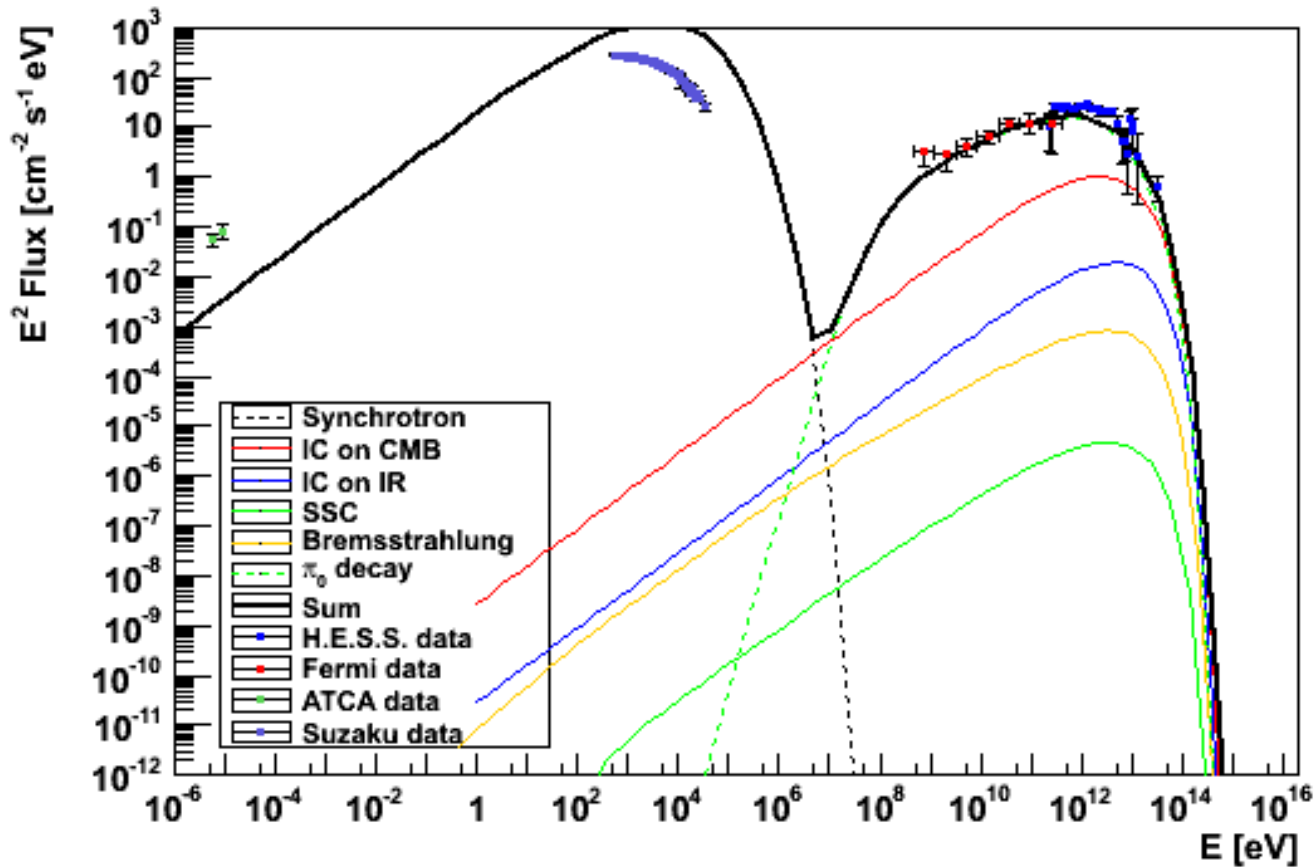
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $100 \mu\text{G}$



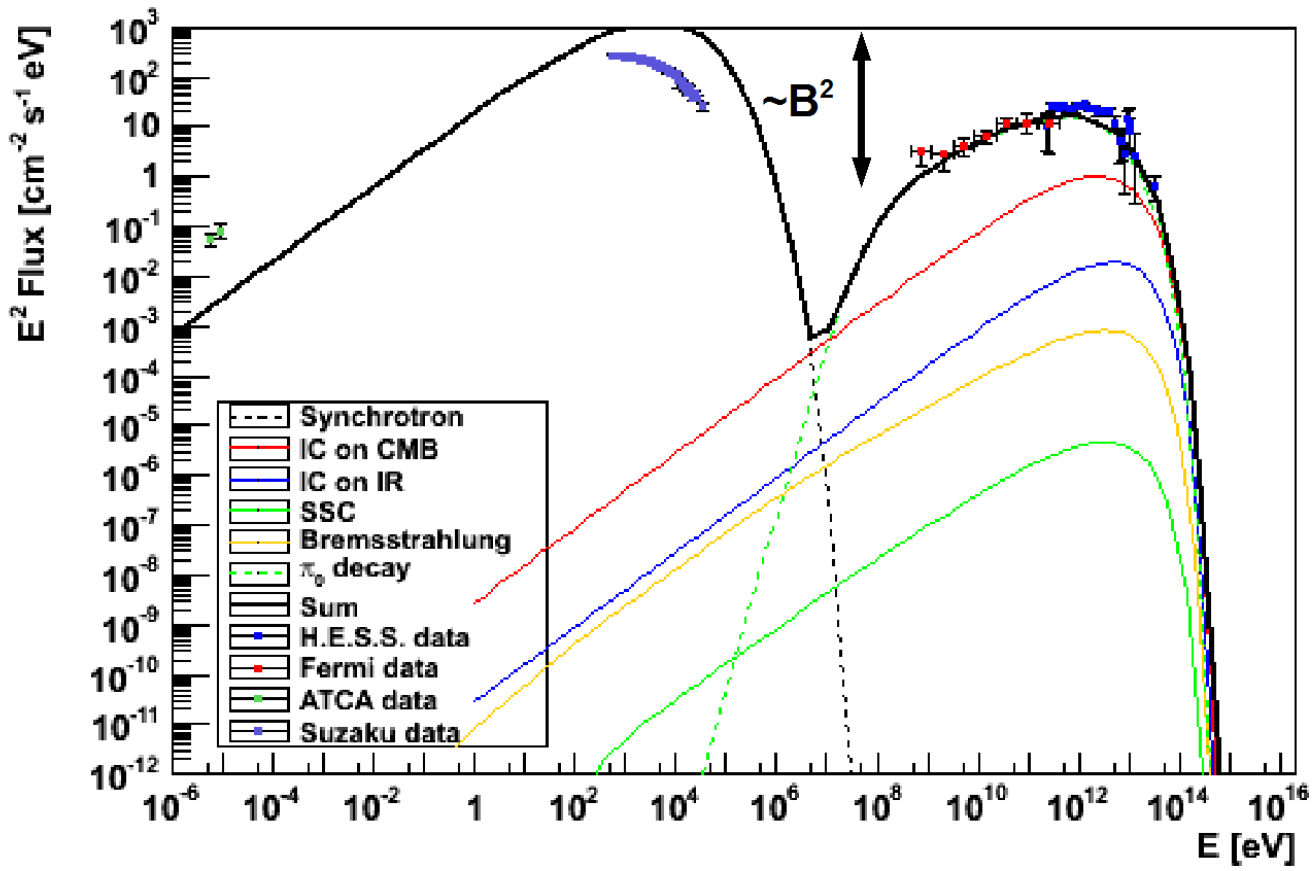
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $100 \mu\text{G}$



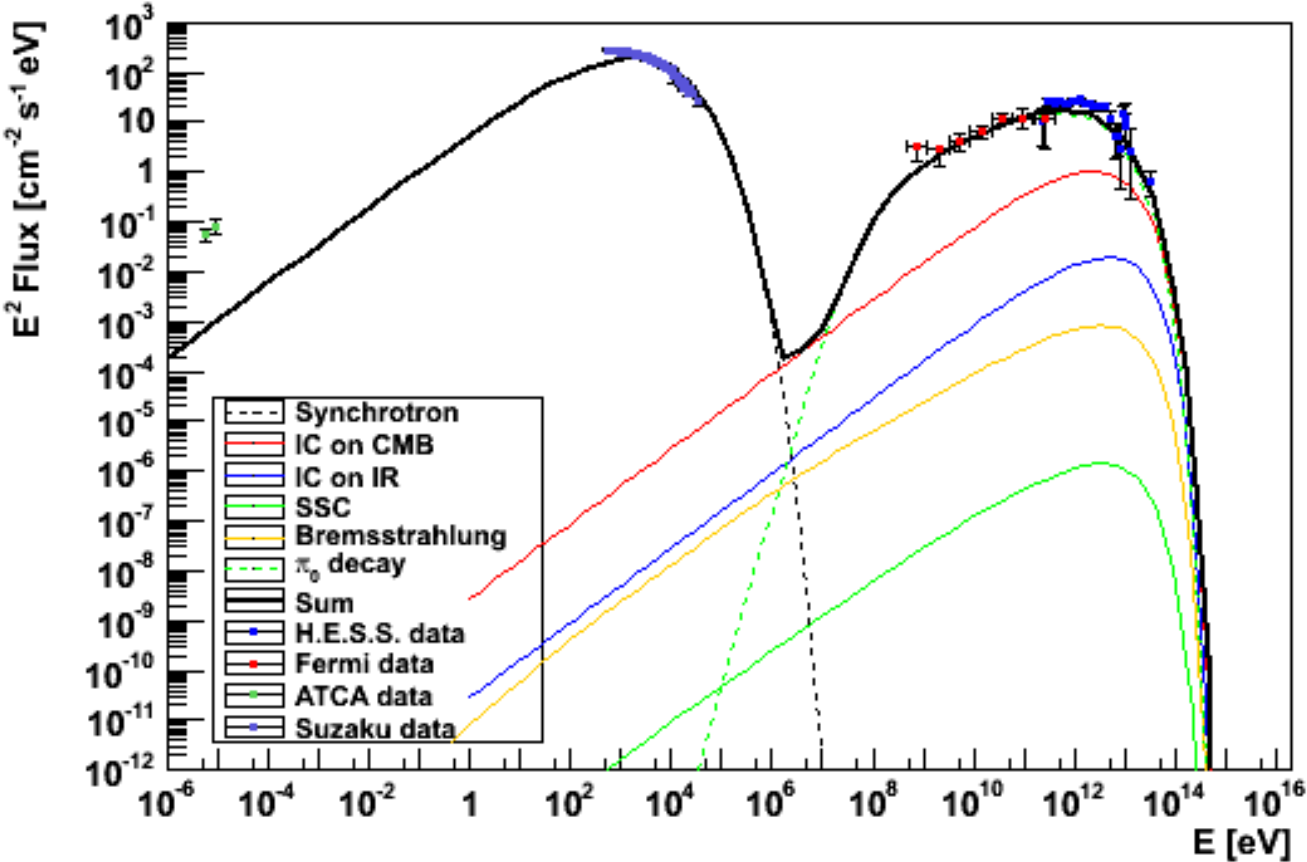
Einfluss des Magnetfelds für $B = 20 - 100 \mu\text{G}$

Magnetfeld = $100 \mu\text{G}$



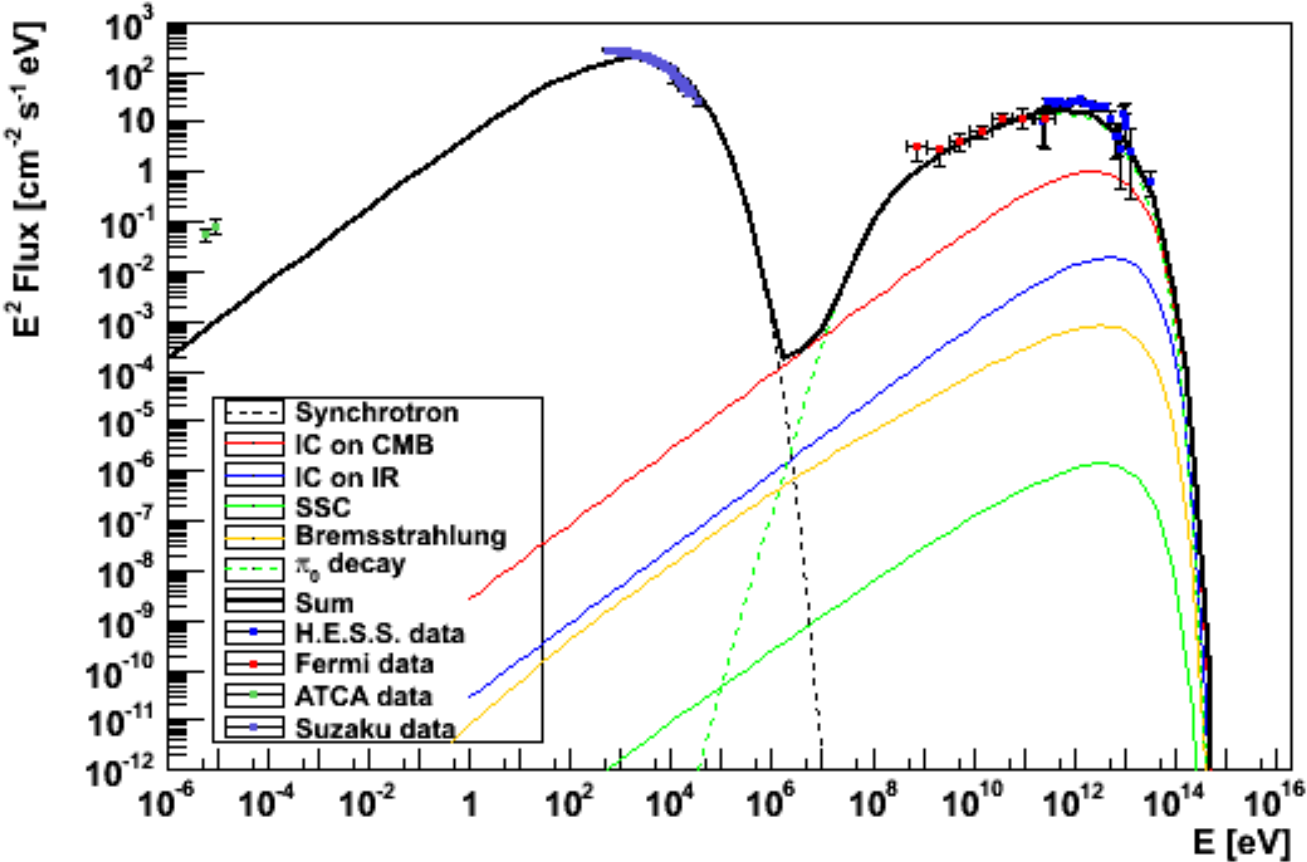
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.5



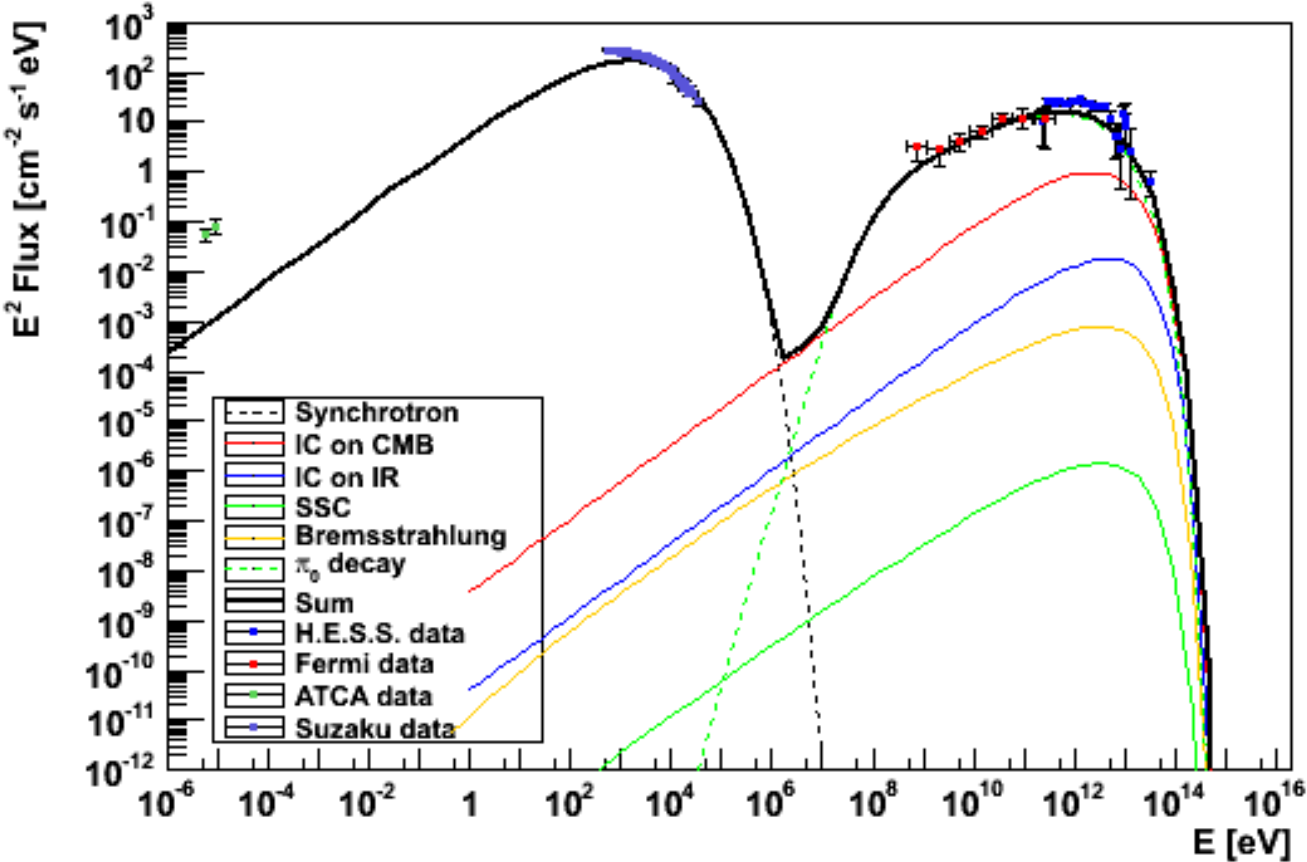
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.5



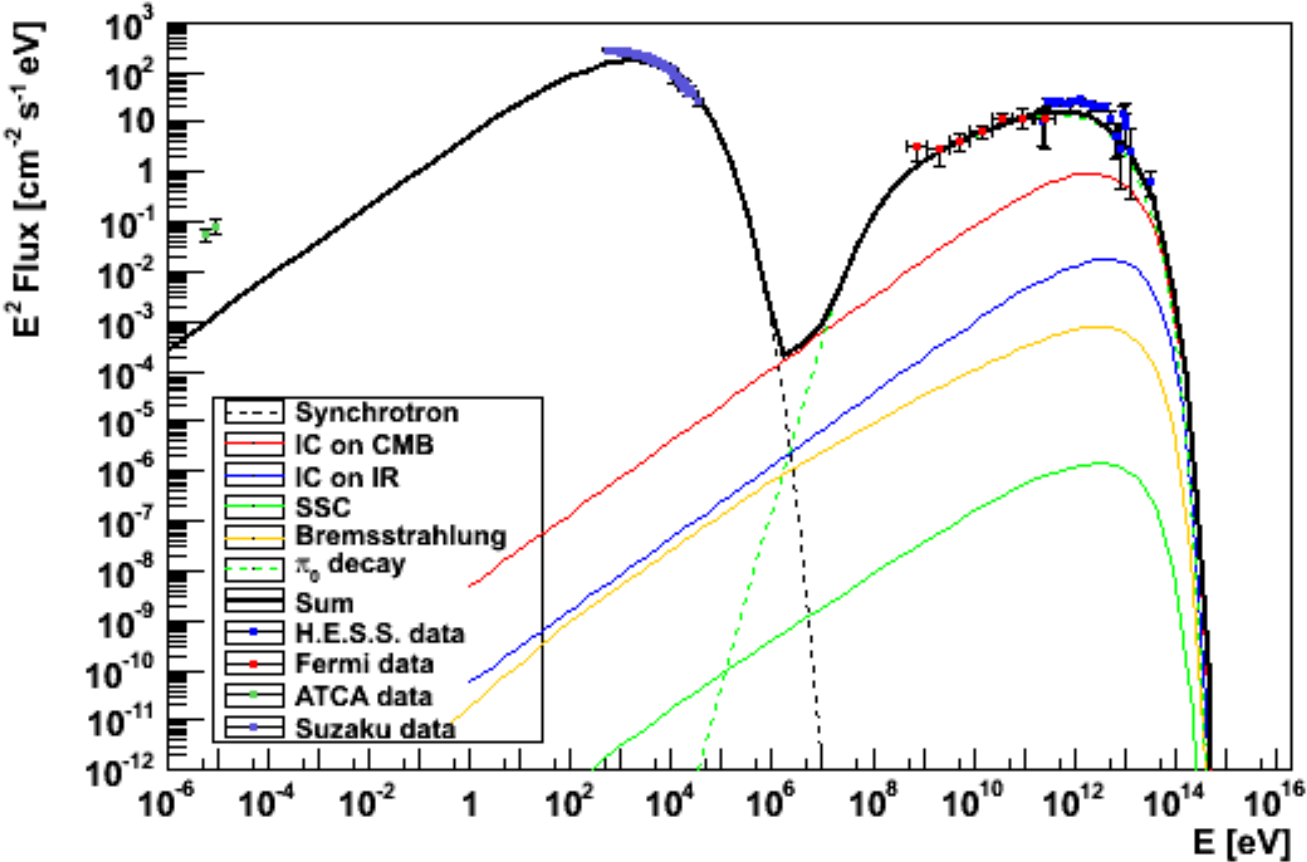
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.525



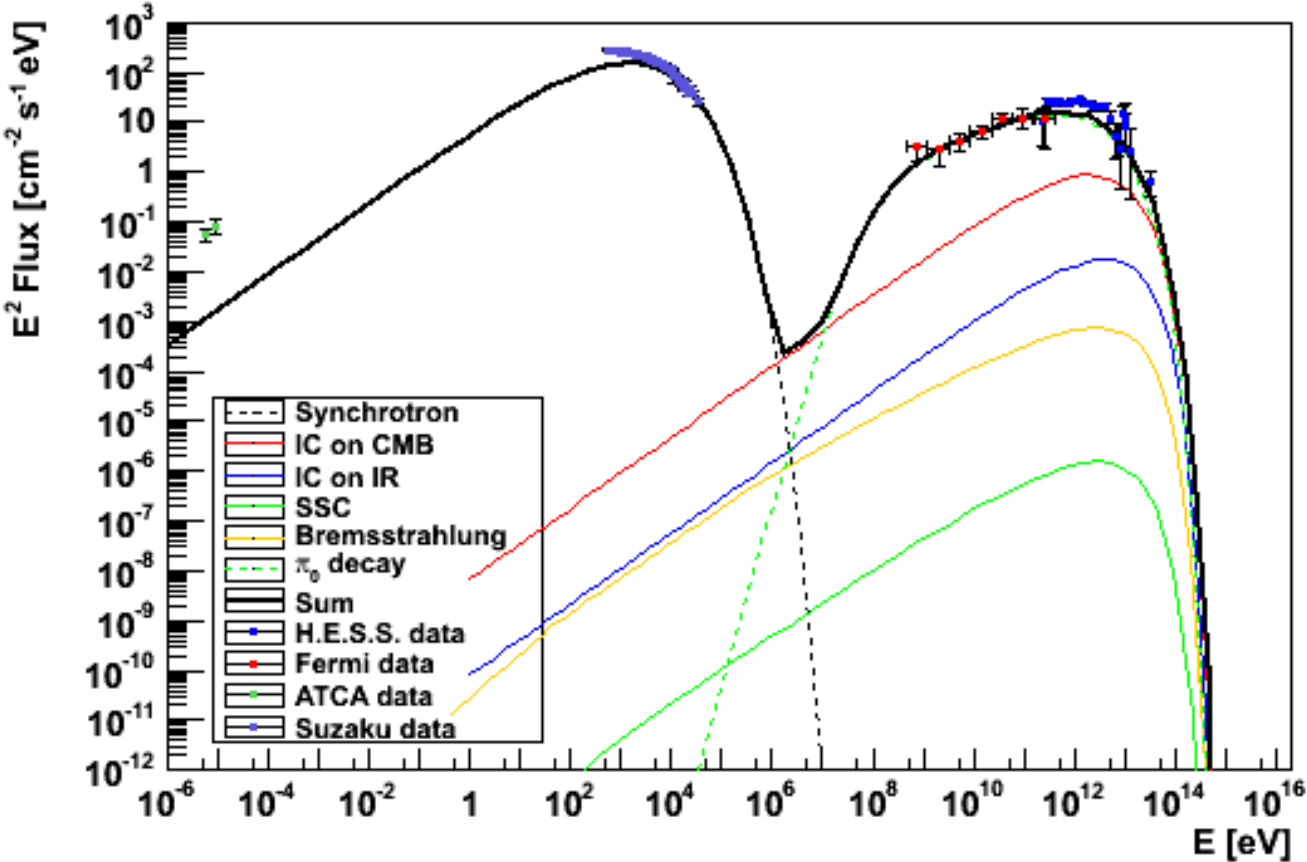
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.55



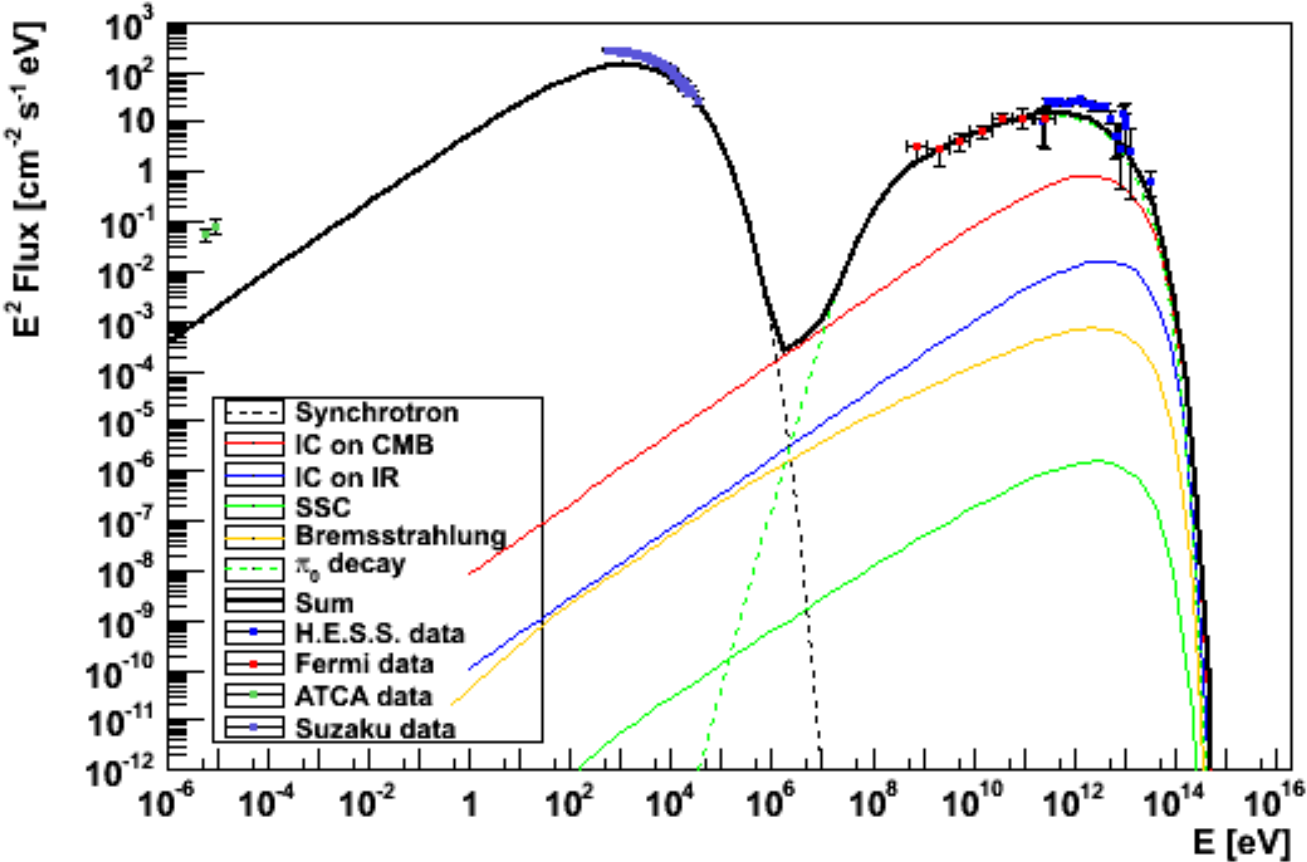
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.575



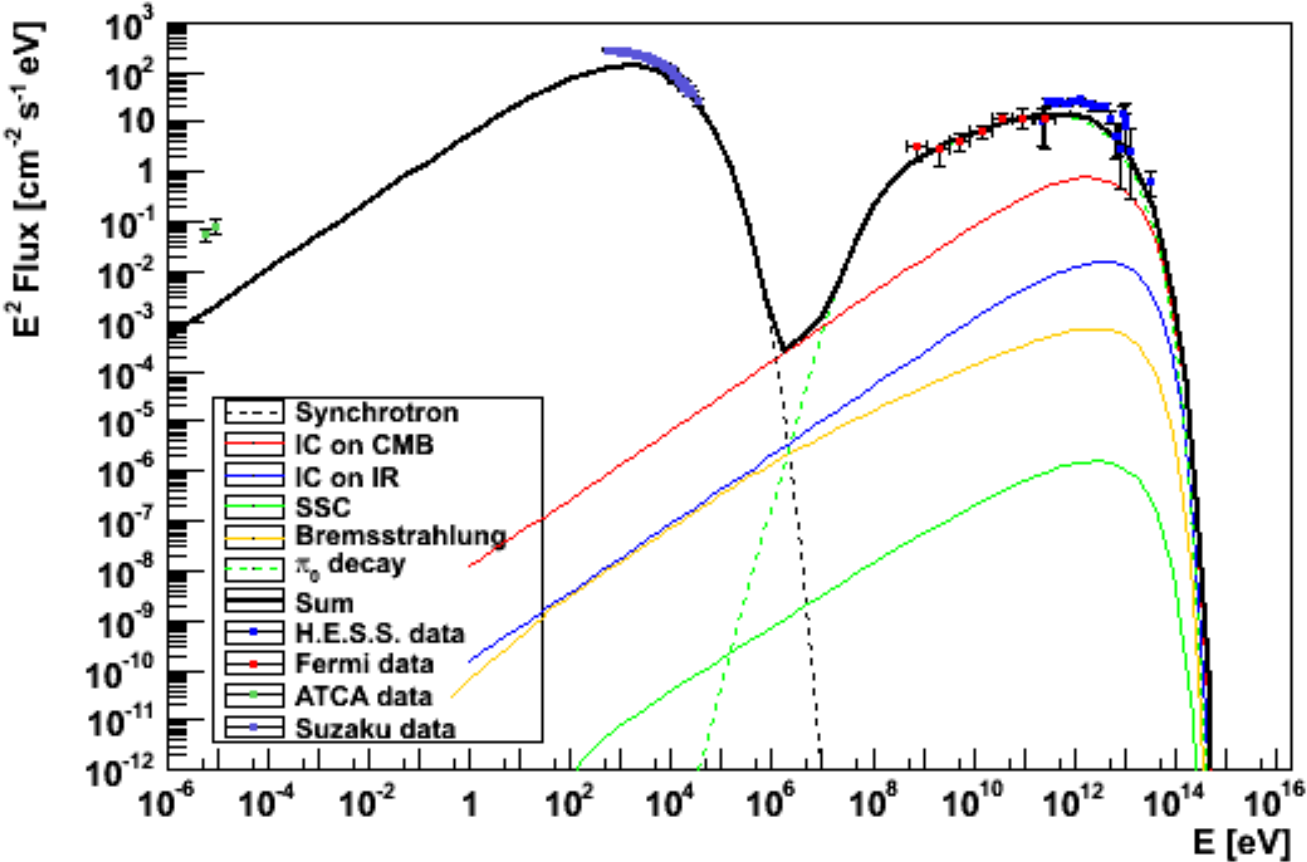
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.6



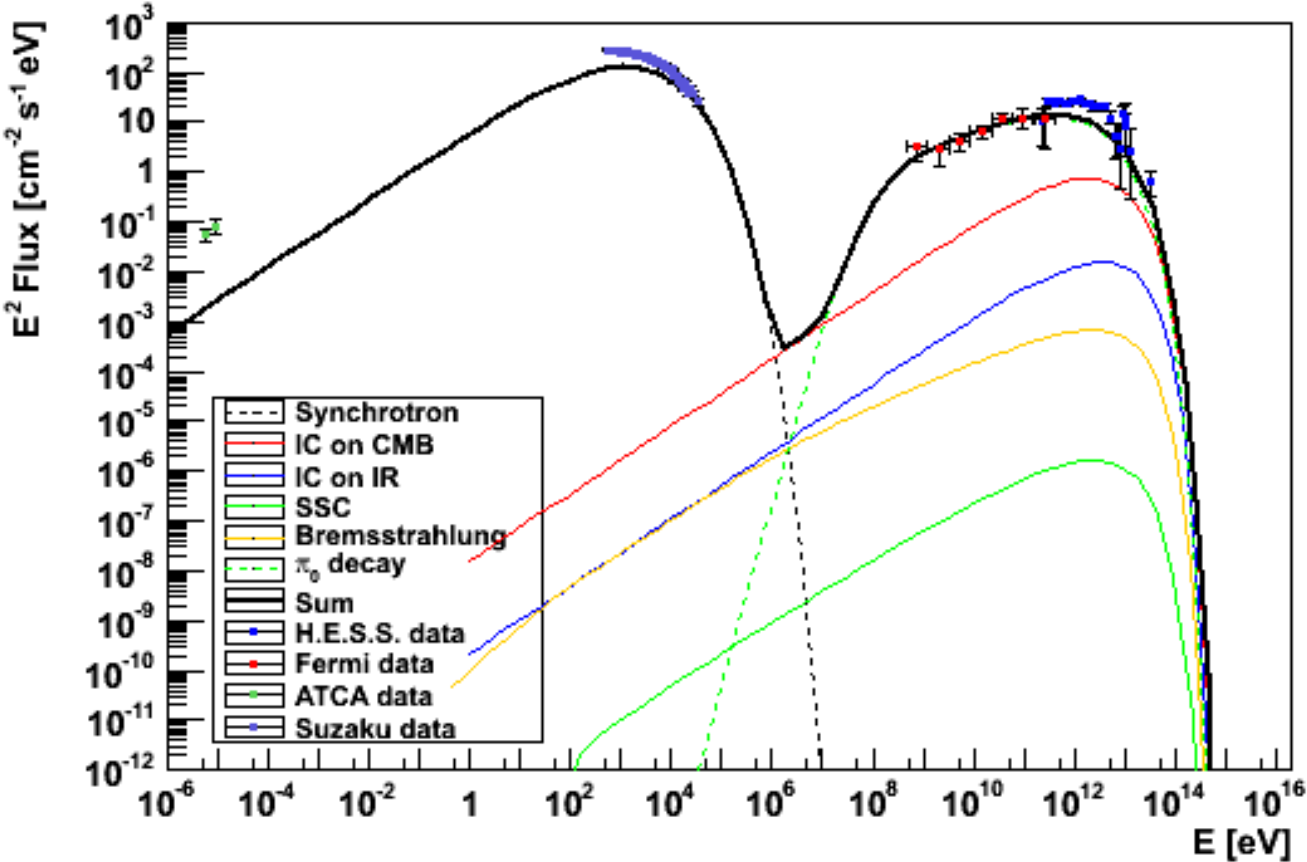
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.625



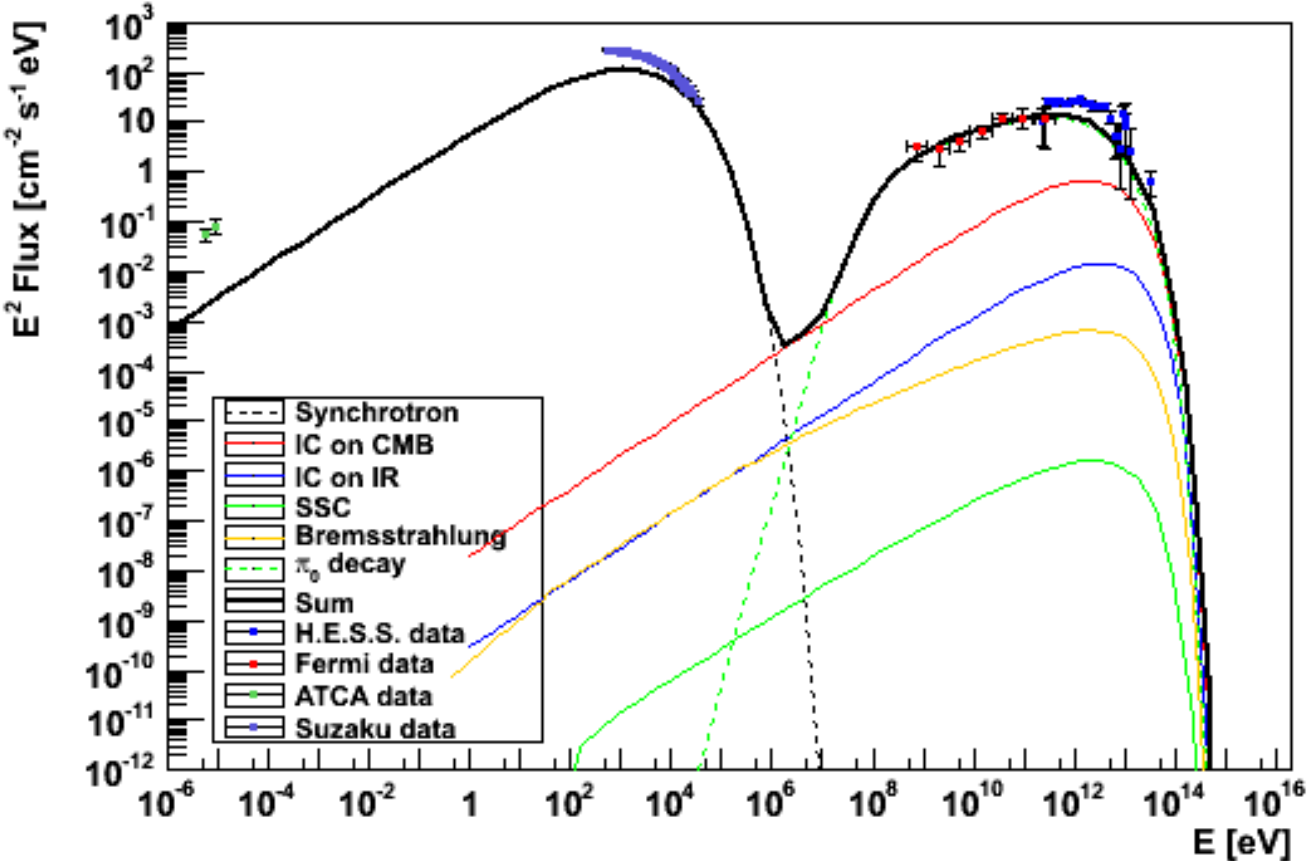
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.65



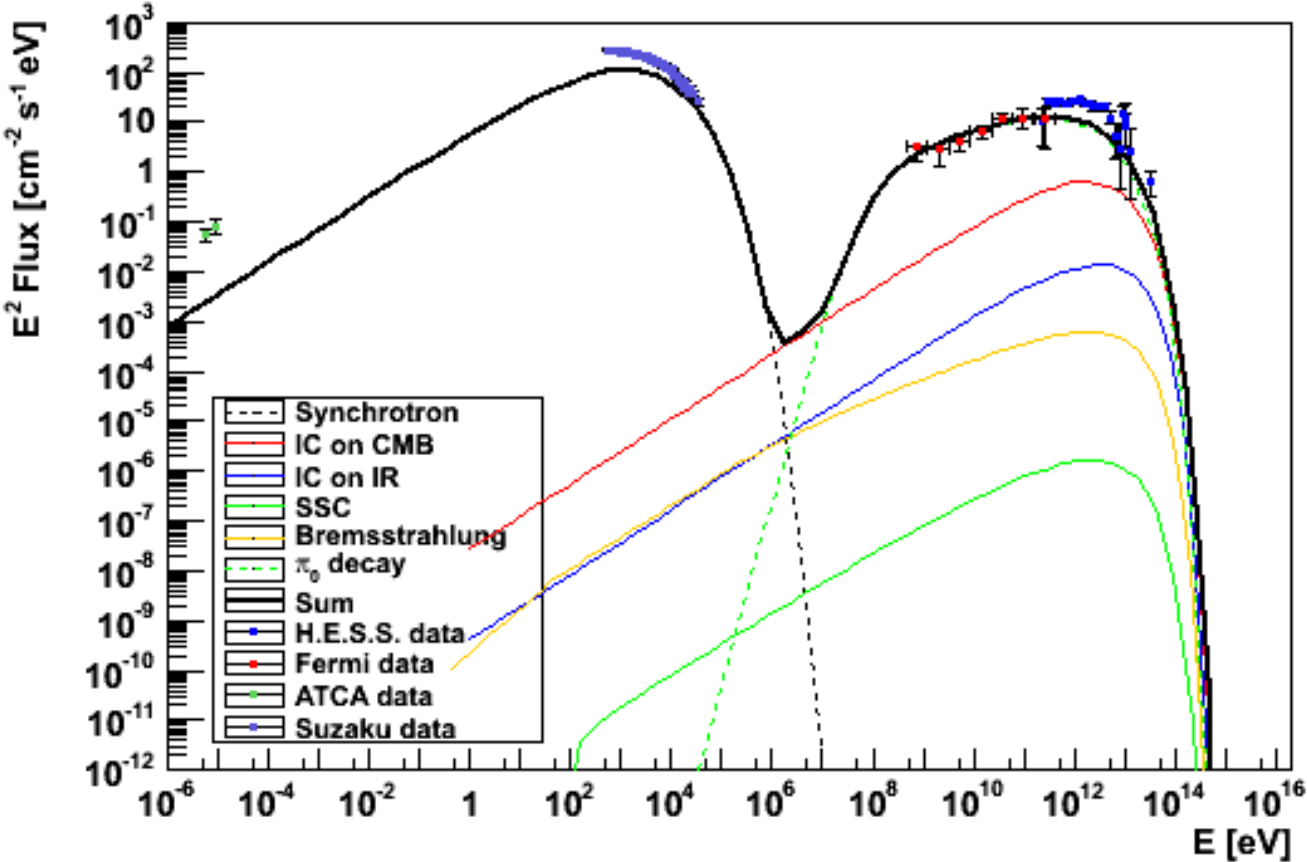
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.675



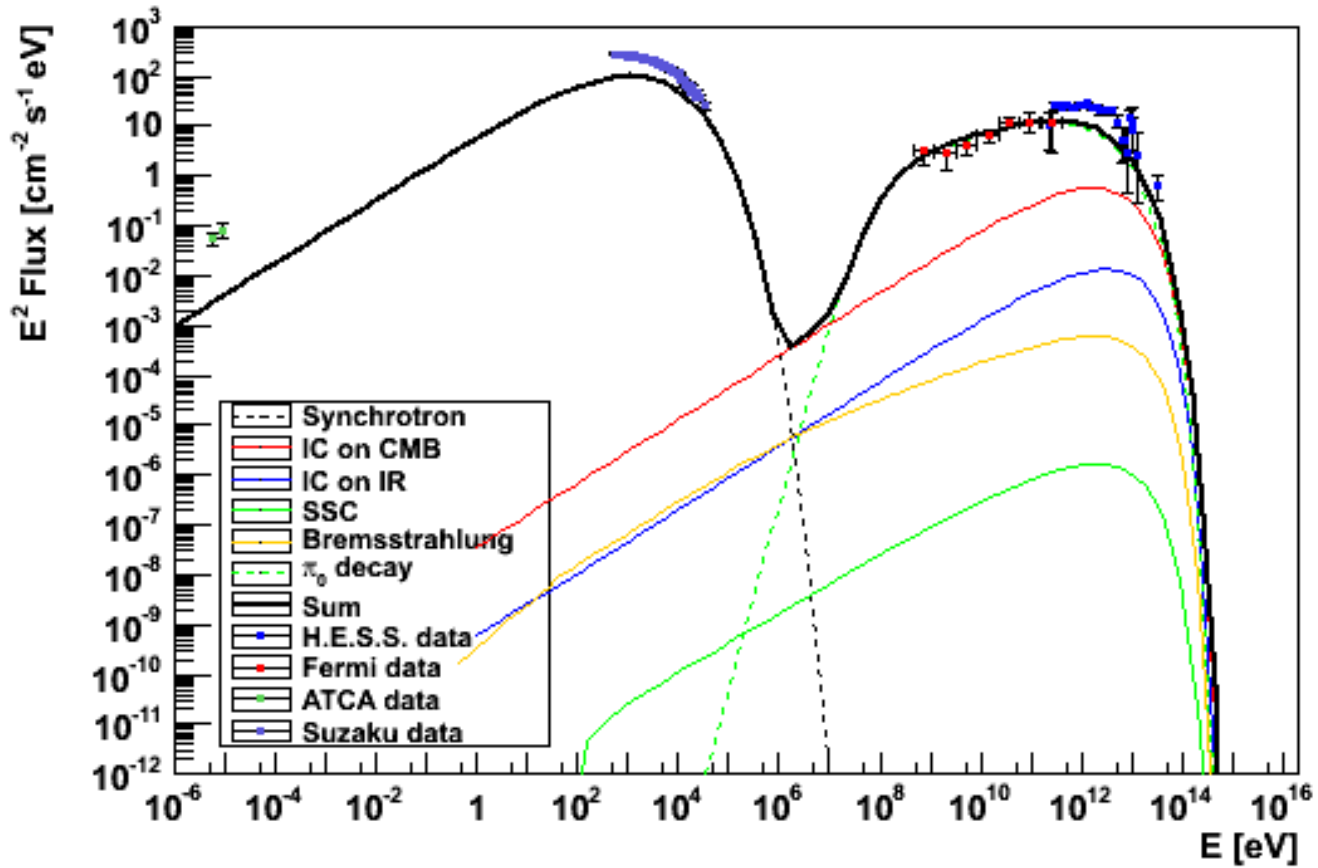
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.7



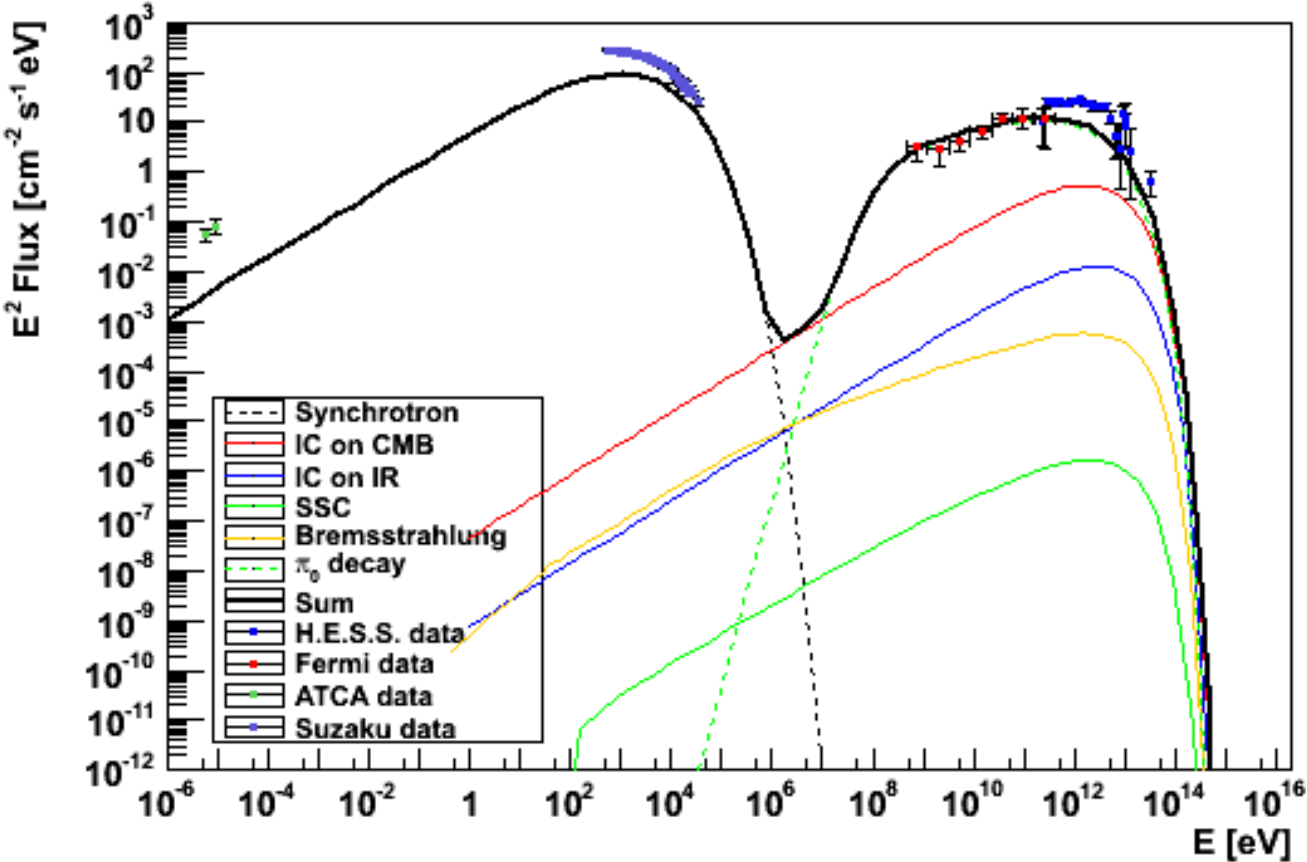
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.725



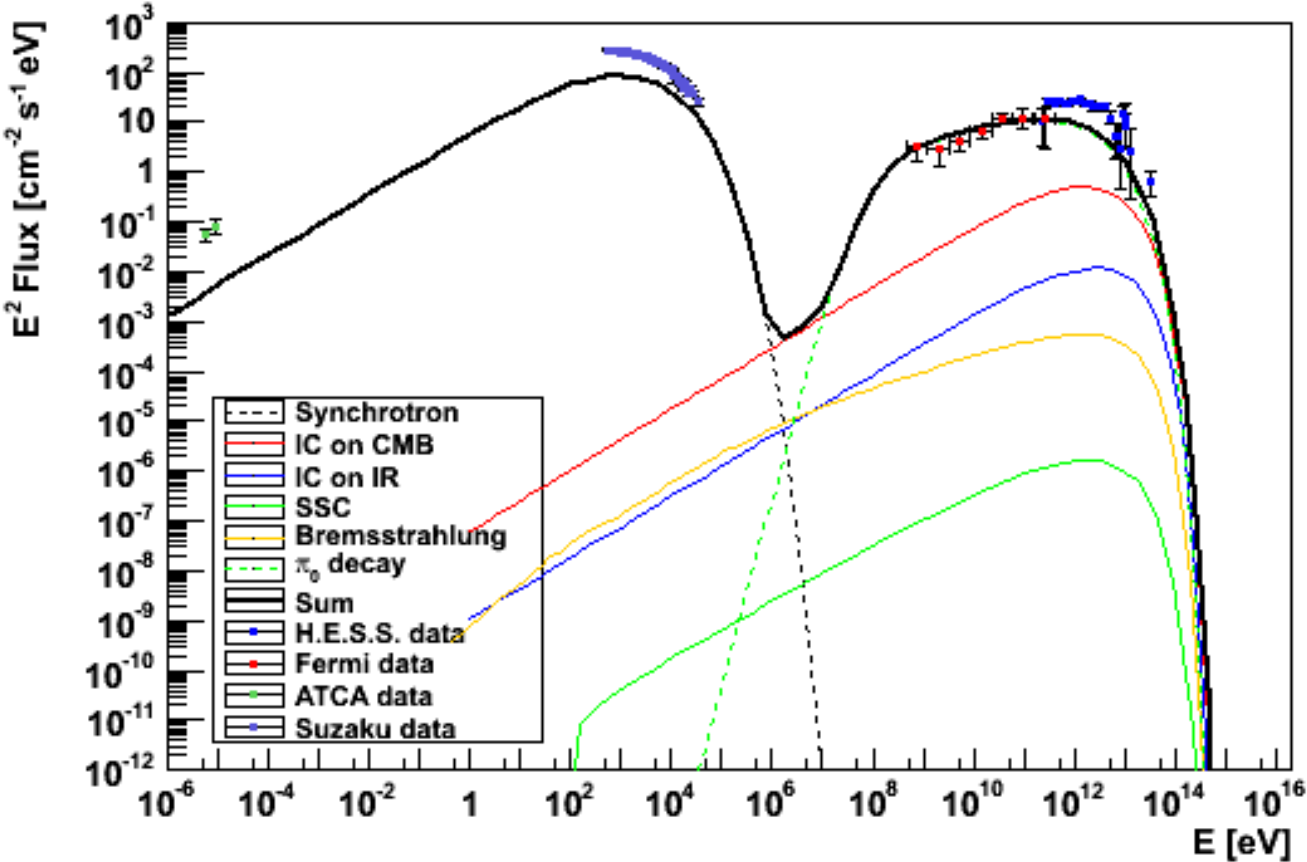
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Index = -1.75



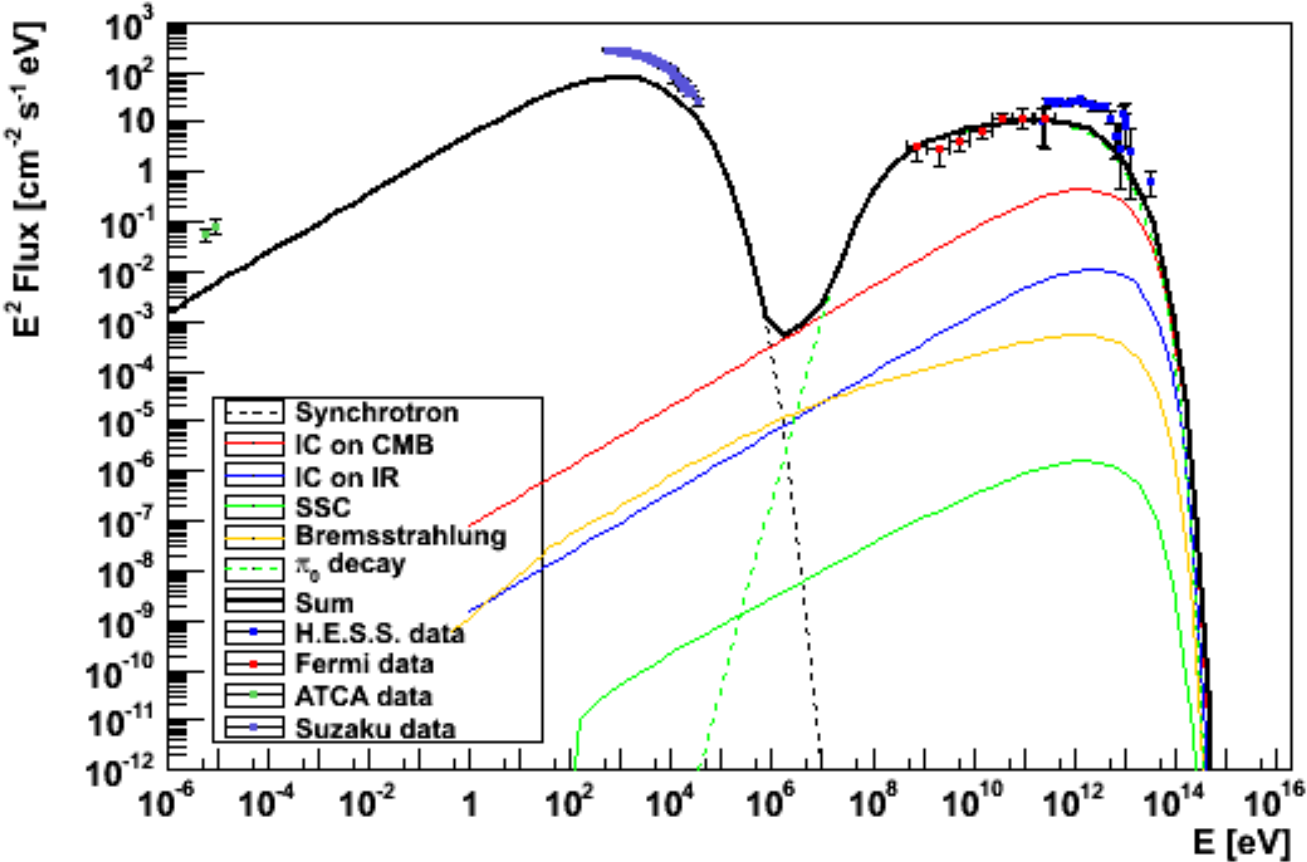
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.775



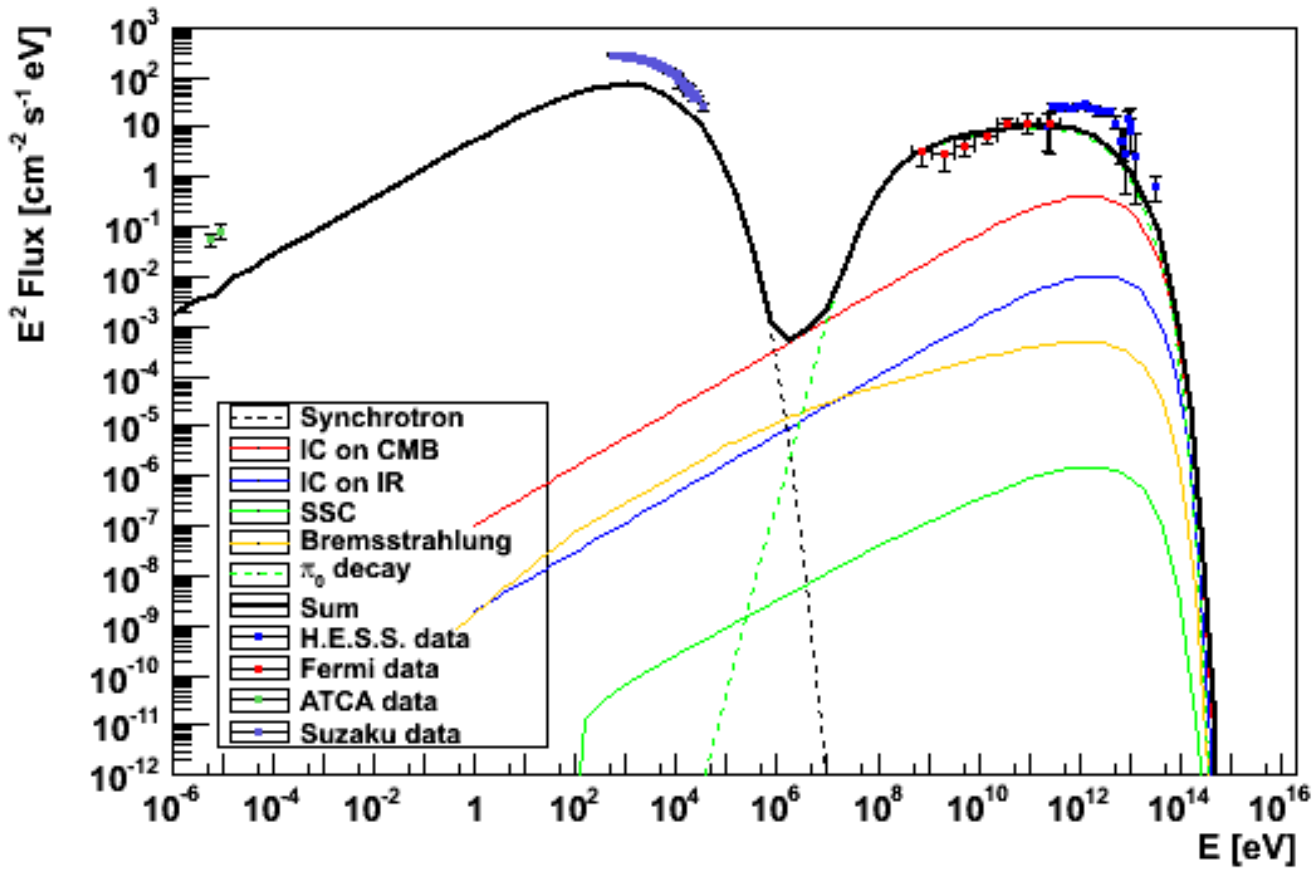
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.8



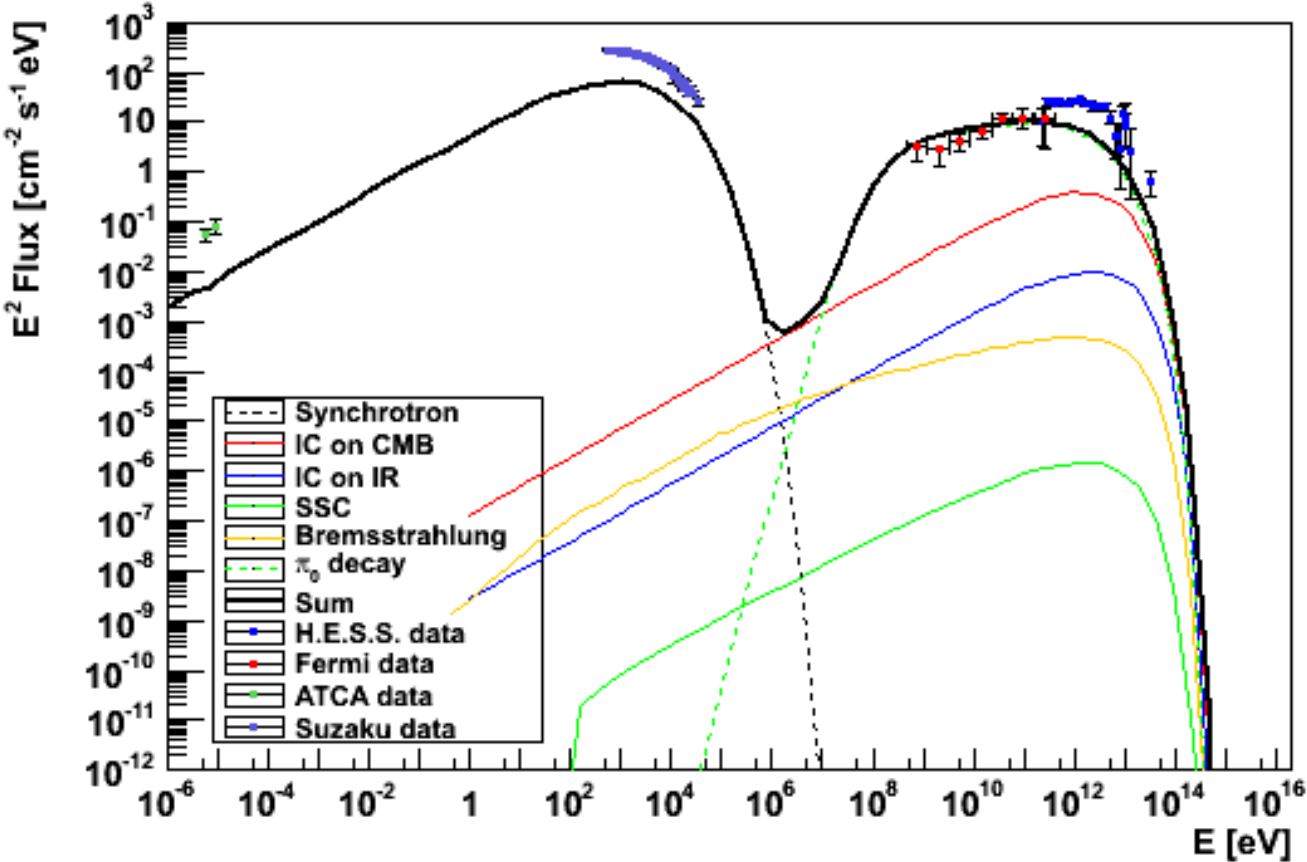
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.825



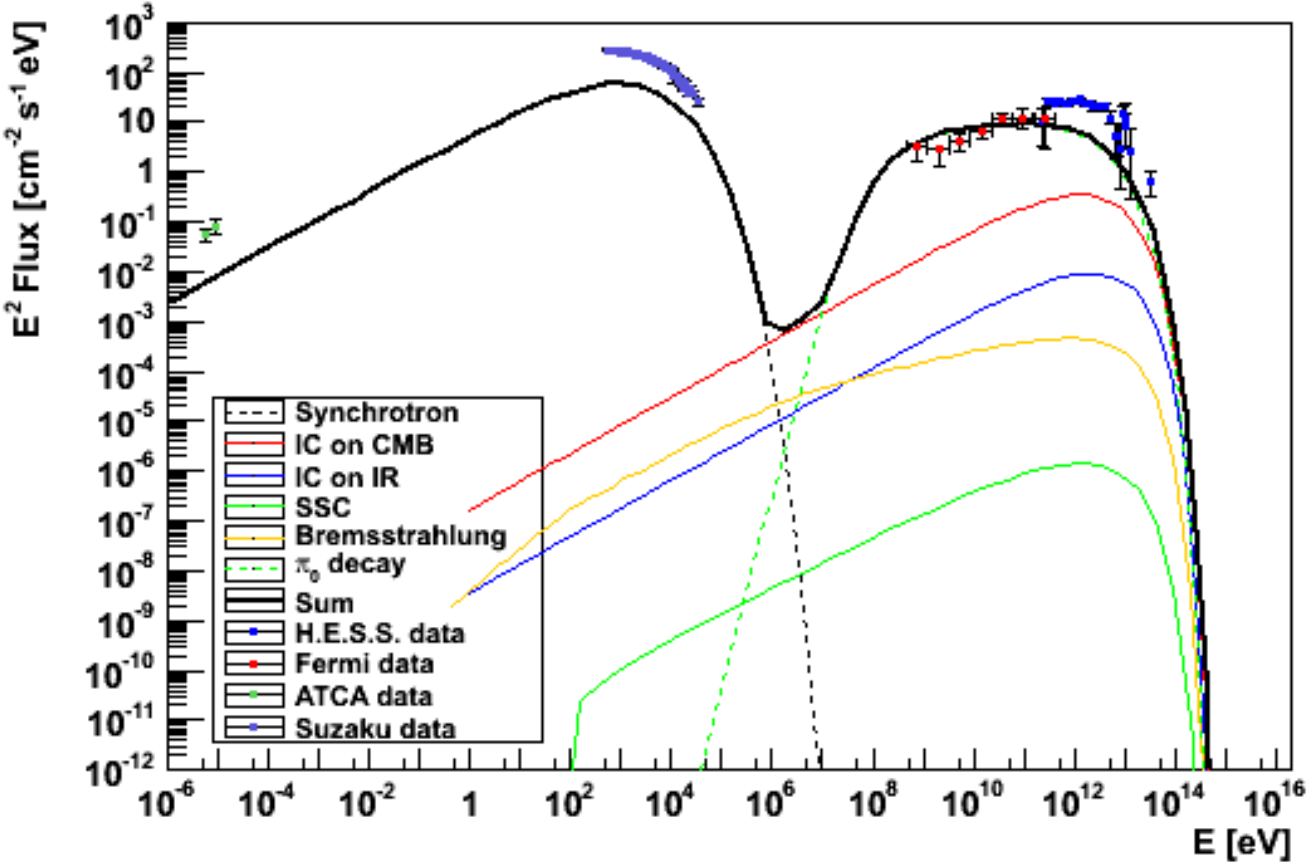
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.85



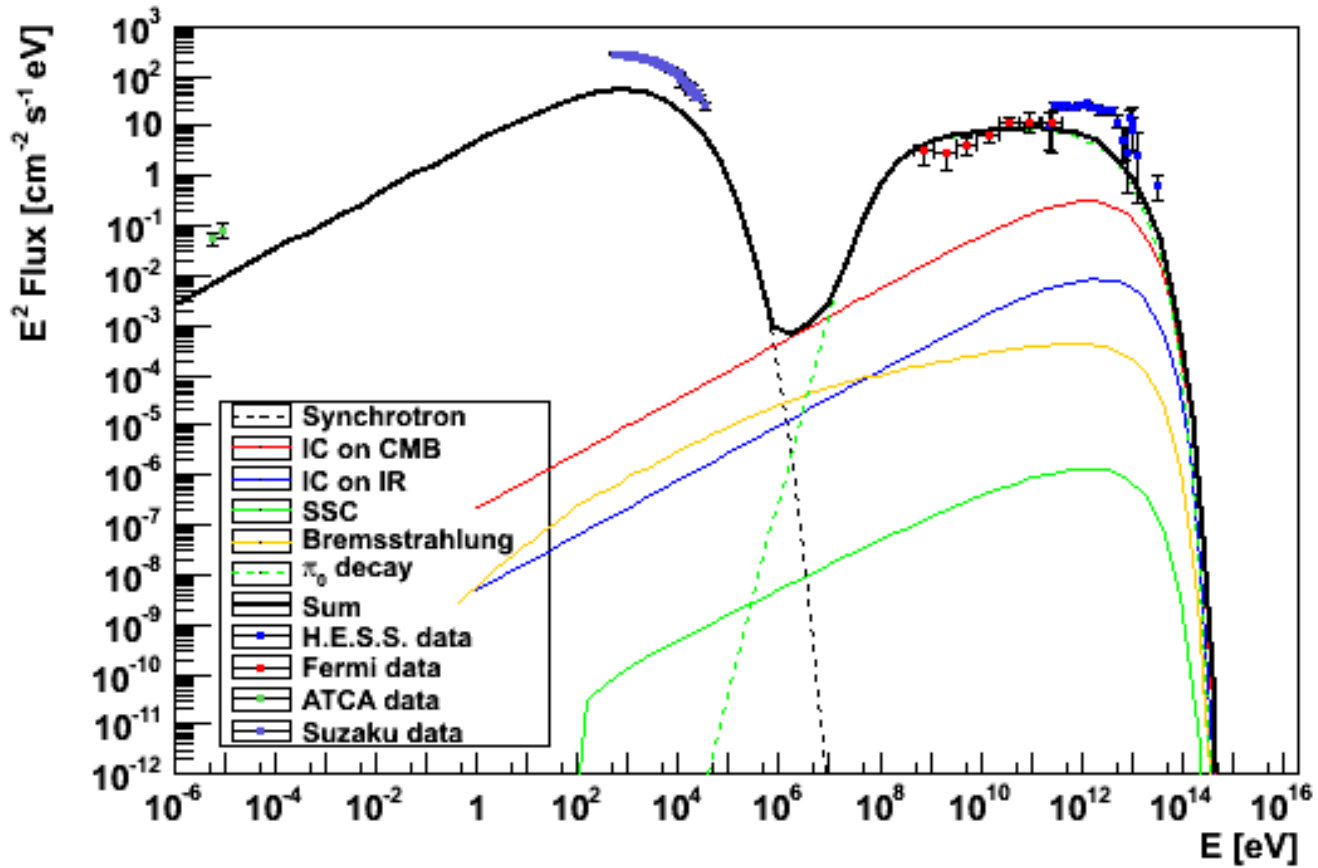
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.875



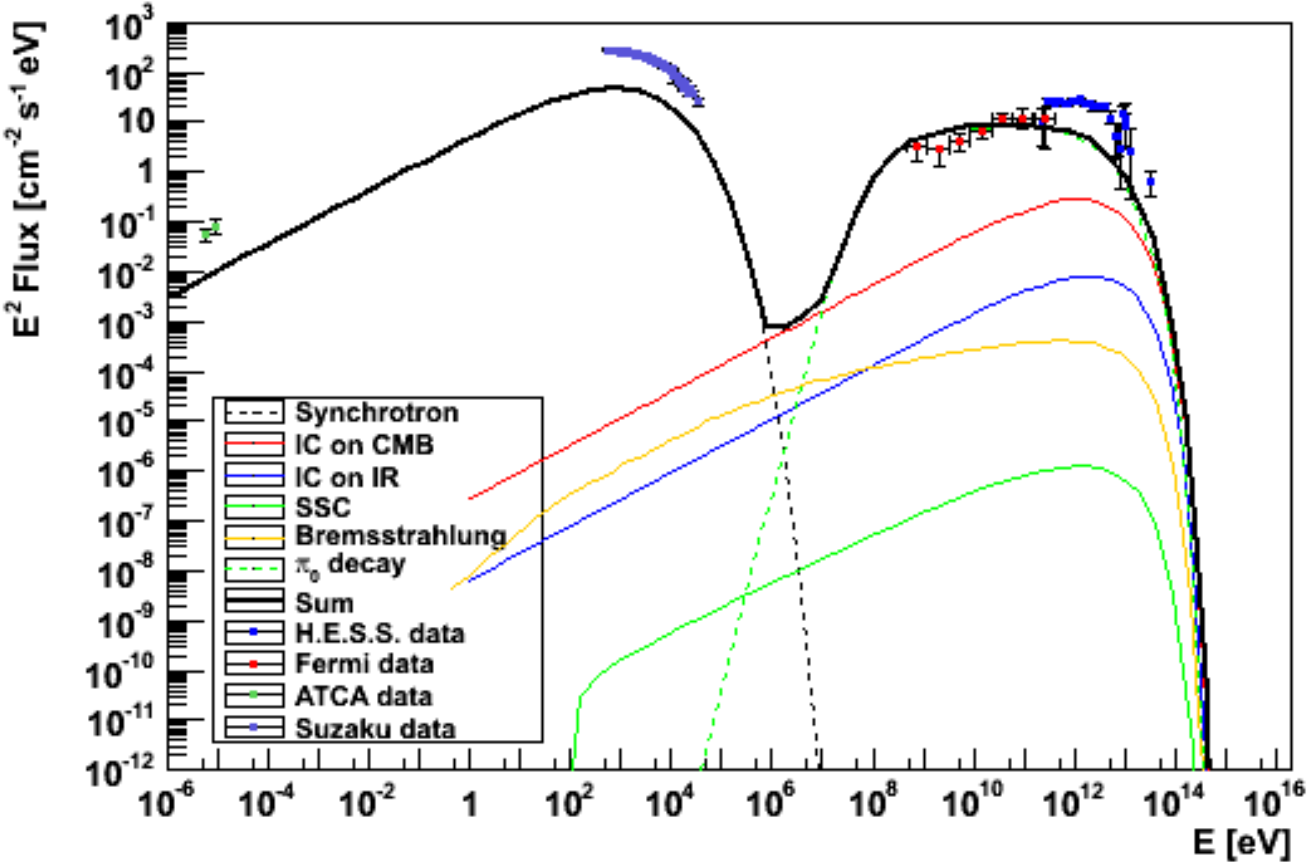
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.9



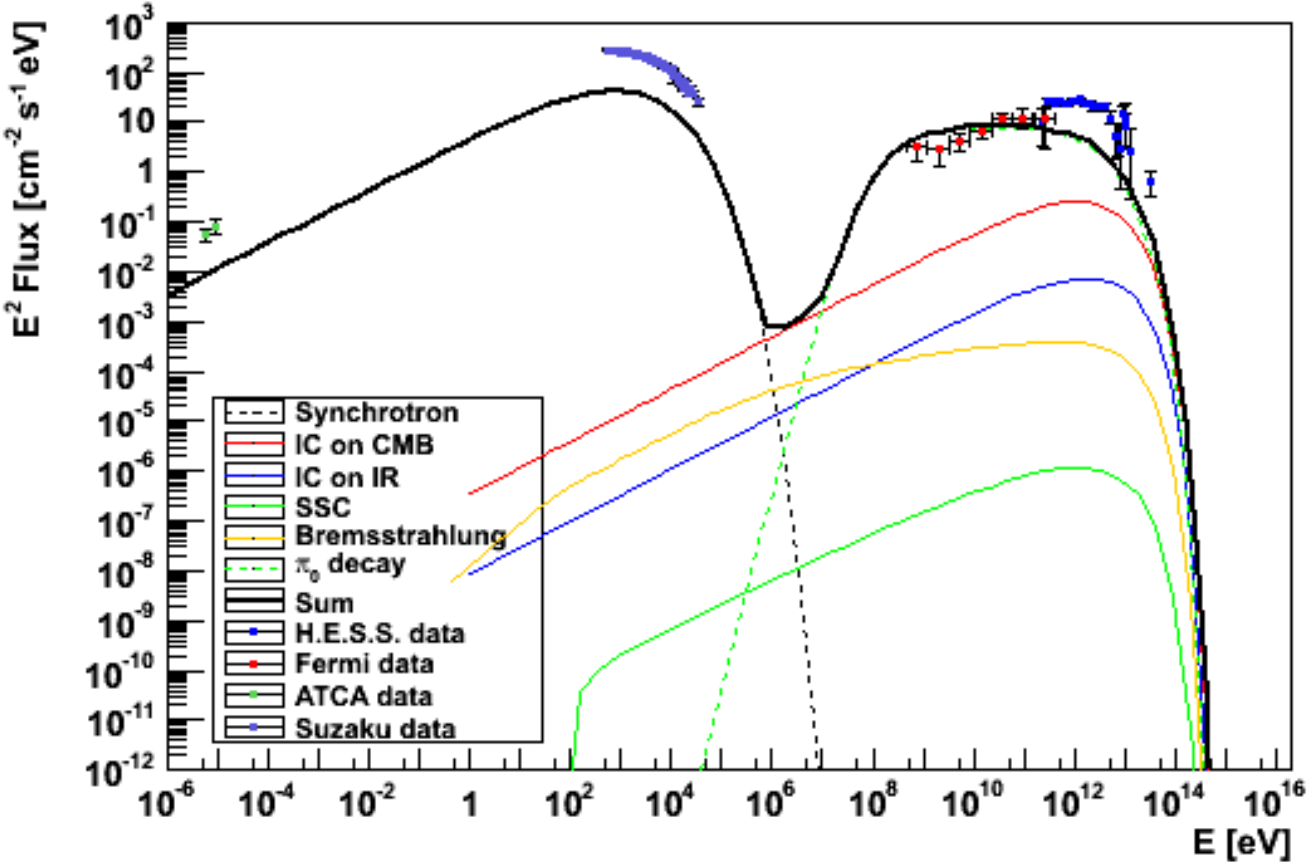
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.925



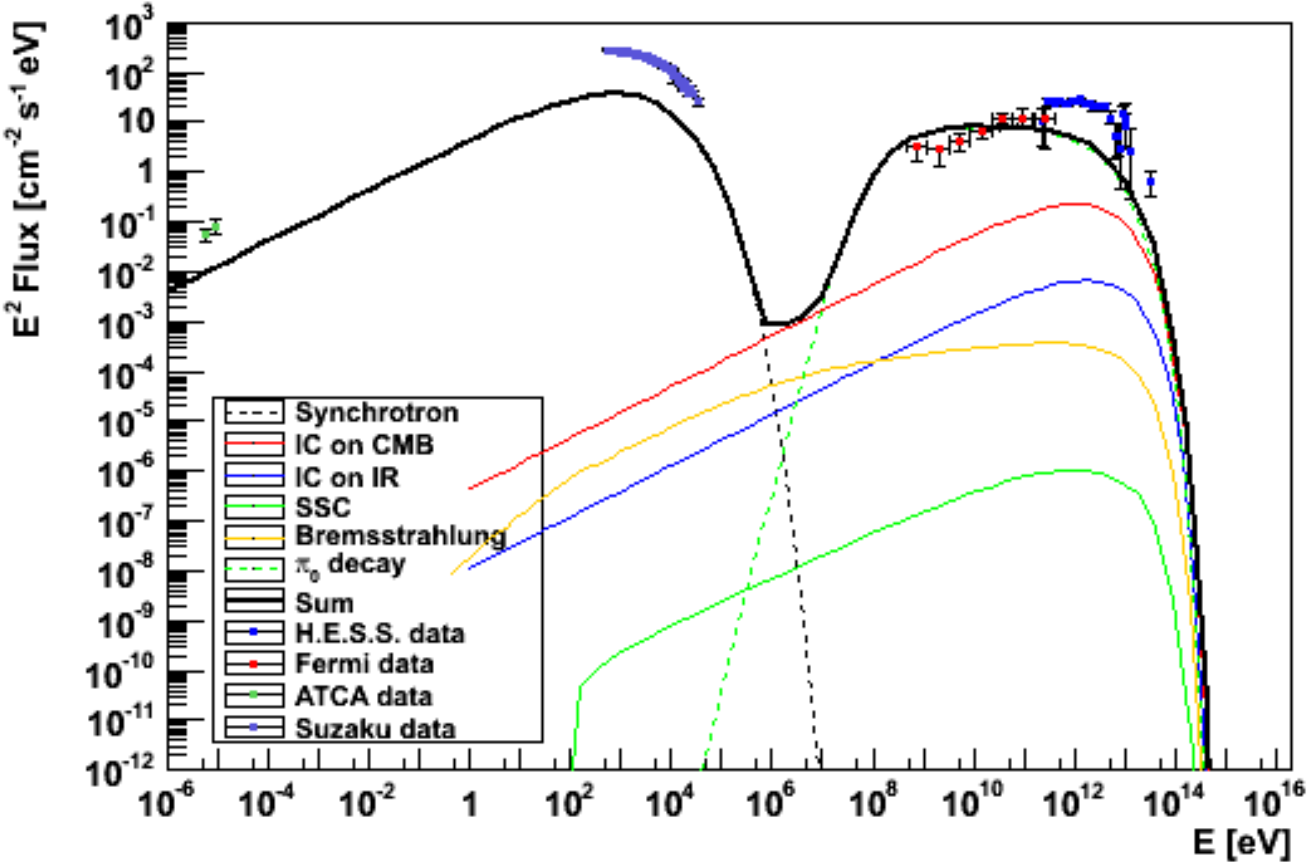
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.95



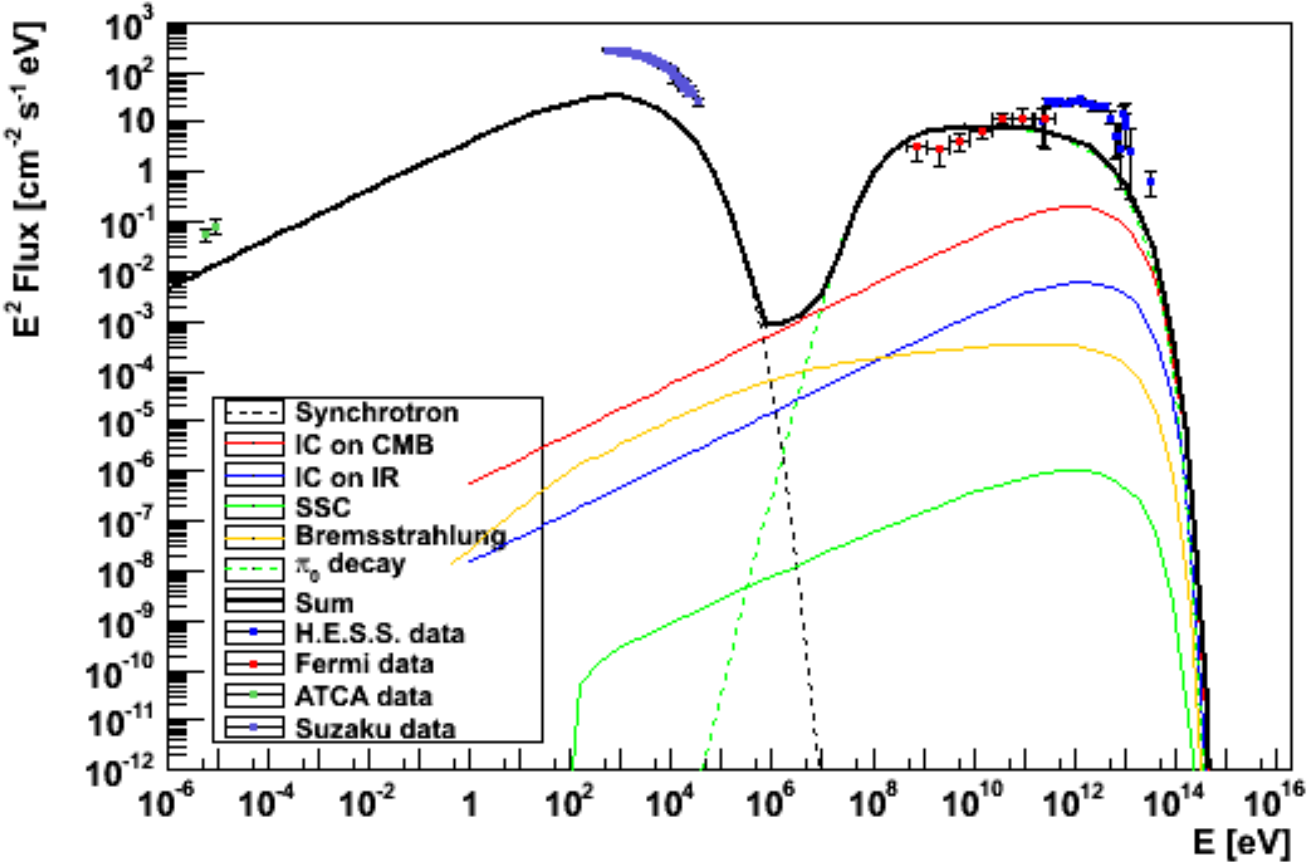
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -1.975



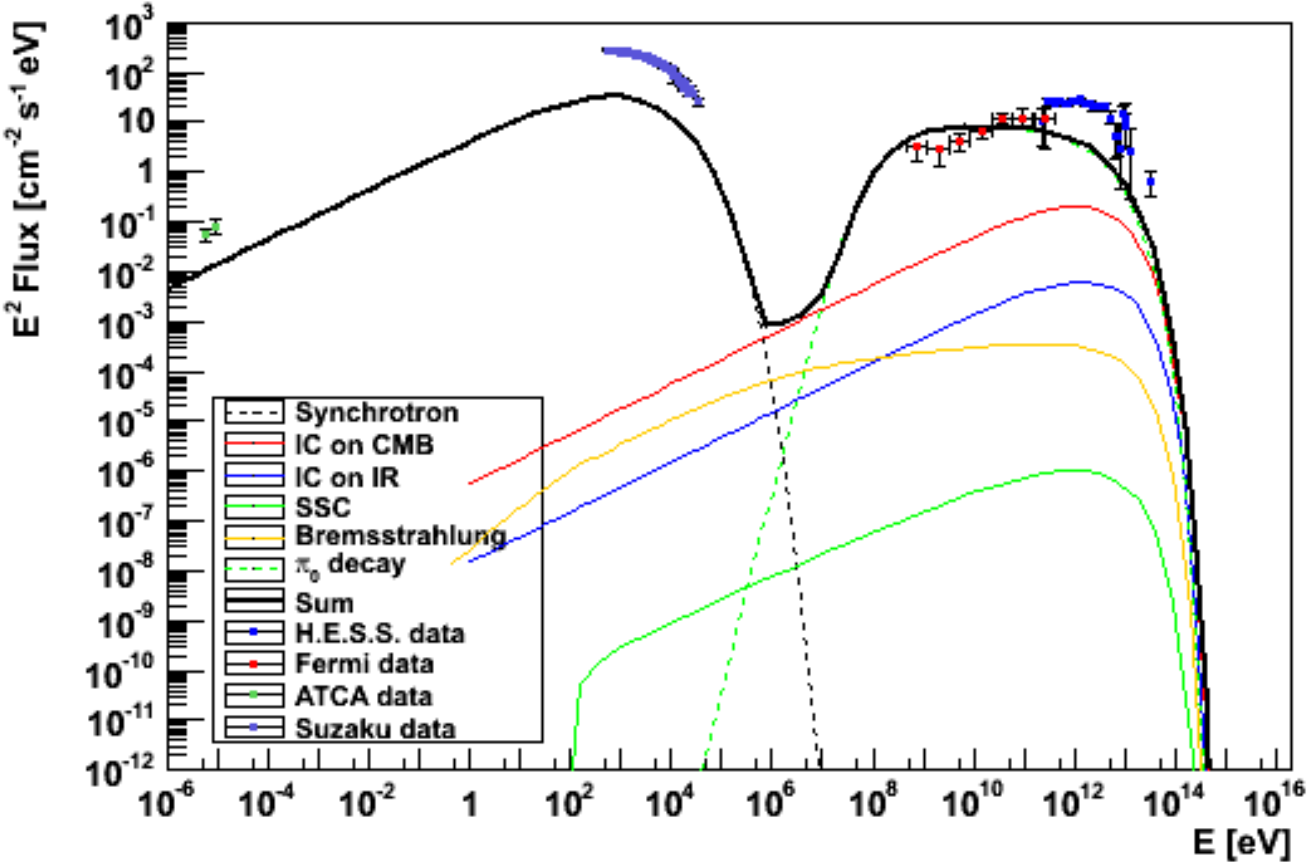
Einfluss des Index von $\Gamma = -1.5 - -2$

Index = -2



Einfluss des Index von $\Gamma = -1.5 - -2$

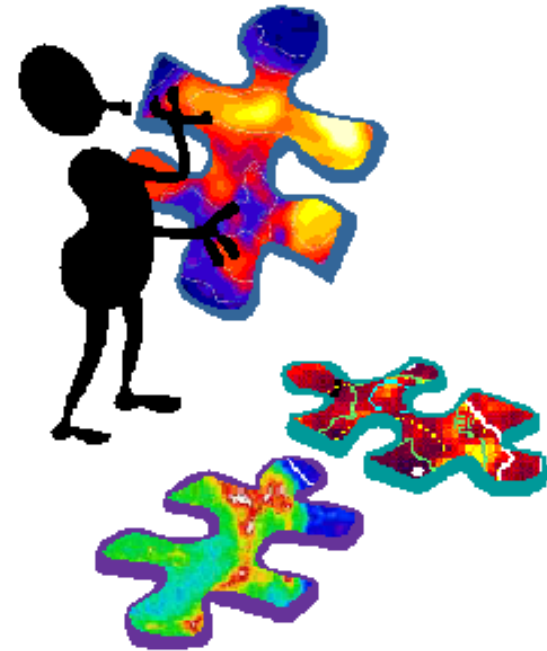
Index = -2



Ausblick

Grundlage für modellabhängige
Simulationsstudie:

Verbessert ein kombinierter Fit
von Fermi- und H.E.S.S.-Daten
die Bestimmung spektraler
Parameter?



References I

- 📄 *Abdo, A. A. et al. (2011).*
- 📄 *Acero, F. et al. (2009).*
- 📄 *Aharonian, F. et al. (2006).*
- 📄 *Lazendic, J.S. et al. (2004).*
- 📄 *Tanaka, T. et al. (2008).*
- 📄 *Wang, Z.-R., Qu, Q.-Y. & Chen, Y. (1997).*