Contents

1 Individual paper notes

1.1 Afterglow response from adiabatic blob expansion - '21

- Afterglow peak for blazars occurs weeks to years after the initial jet (GeV 'leads' the radio) – observed 40 days for Mrk421, longest 140 days in another
- Applies 'convolution' of gamma-ray lightcurves into afterglow response
- This afterglow from the jet is a bit of a blob of ejecta expanding – would the same shaped curve occur with a presumably spherical shell of ejecta centered on the PBH itself? Could the PBH produce an asymmetrical shell due to rotation, charge, etc.?

1.2 Blandford '77: Spectrum radiopulse from EBH

- e^-, e^+ pairs + "typical" interstellar $\vec{B}$ field: KE of pairs → radio waves
- 50% rest mass → e^-, e^+ pairs of $100(\text{m/1e11kg})^{-1}$MeV
- Pairs behave EM like a relativistically expanding conductor → virtual photons boosted by γ^2
- Characteristic frequency: $\gamma^2 c/R_c$
- Total radiated energy is dominated by frequency ν 1GHz = 4e-6 eV

Lmao this is a Jackson problem. Current creates angularly radiated field.

- critical frequency $1.1\gamma_{f5}^{8/3b^{2/3}E_{25}^{1/3}}$ GHz
- given most energy will emerge v v_c, spectral indices are $v << v_c$:0.57, $v >> v_c$:4

$$\begin{gathered}
P_{em} = 1e23 \times (\gamma_{f5}^2 b^2 t^2 [W/\text{ster})] \\
\text{LAT } 0.5m^2 < A_{eff} < 1m^2 \\
\text{at } d, 1 \text{ ster} \rightarrow d^2 \qquad (1) \\
P_{em}[\frac{W}{\text{ster}}] = (E[W])(\frac{d^2}{A_{eff}}[\frac{m^2}{m^2}])
\end{gathered}$$

1.3 Cutchin '15: Constrain rate of PBH explosion using low-freq radio

- radio transient from EBH "could be signature of a extraspatial dimension"
- Eight-meter-wavelength Transient Array (ETA) no signal in 4hrs of data
- observational upper-limit of 2.3e-7 pc-3 yr-1
- They use Rees model stated in Blandford and not on Carr 91
- $\gamma_f = \frac{1/2 \times kT}{m_e c^2} \approx 1e5(\frac{1e11g}{M})$
- $\gamma_{f5} = \gamma_f/1e5$, $\nu_{01} = \nu/0.01$, $E_{23} = E/1e23J \approx \nu_{01}\gamma_{f5}^{-1}$
- $Mc^2 = \frac{\hbar c^3}{16\pi G m_e}\gamma_f^{-1}$

1.4 Rees '77 Nature

- Better detected by an attenna (1e4pc) than a detector of A_{eff} $.1m^2$ (1e-2 pc)
- "Linearly polarized radio-freq pulses (rather than γ-ray ... most conspicuous)"