



Erratum: “Cascading Constraints from Neutrino-emitting Blazars: The Case of TXS 0506+056” (2019, *ApJ*, 881, 46)

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We wish to correct the definition of the comoving target photon energy density in Section 4 of the published article which should read

$$u'_t \approx m_e c^2 n'_{\text{ph}}(\epsilon'_t) \epsilon'_t$$

with $\epsilon'_t = \epsilon'/(m_e c^2)$ the dimensionless comoving photon energy of the target field with density $n'_{\text{ph}}(\epsilon'_t)$ (differential in energy; see Section 3.1 of the published article). As a consequence Equation (5) becomes

$$L'_\nu \approx 1.3 \times 10^{-14} N_0 u'_t \epsilon'^{-1}_t \text{ cm}^3 \text{ s}^{-1},$$

and Equation (6) changes to

$$N_0 u'_t \approx 1.3 \times 10^{57} D_1^{-4} \epsilon'_t \text{ erg cm}^{-3}$$

with D the Doppler factor $D \equiv 10 D_1$. The relativistic proton kinetic power as evaluated in Equation (11) then gives

$$L_p \gg 1.4(14) \cdot 10^{47} (\Gamma_1/D_1^2)^2 \epsilon'_t \text{ erg s}^{-1} \quad \text{for } D \gg 10 (D \leq 10),$$

with Γ the bulk Lorentz factor $\Gamma \equiv 10 \Gamma_1$. Inserting the required target photon energy $\epsilon'_t \approx 3.1 \times 10^{-3} D_1 \xi_{0.05} E_{14}^{-1}$ (see Section 3.1) yields

$$L_p \gg 4.4(44) \times 10^{44} \Gamma_1^2 D_1^{-3} \xi_{0.05} E_{14}^{-1} \text{ erg s}^{-1}.$$

If the target photon field is comoving with the emission region (Section 4.2) the proton spectrum normalization factor (Equation (14)) results in $N_0 \gtrsim 1.5 \times 10^{60} R_{t,16}^2 \epsilon'_t \approx 4.7 \times 10^{57} R_{t,16}^2 D_1 \xi_{0.05} E_{14}^{-1}$ and the corresponding kinetic jet proton power (Equation (15)) yields values as high as

$$L_p \gtrsim 4.9 \times 10^{52} \Gamma_1^2 R_{t,16} D_1 \xi_{0.05} E_{14}^{-1} \text{ erg s}^{-1}$$

in this case. This significantly exceeds the Eddington luminosity for even the most supermassive black holes known in the universe by several orders of magnitude. Our original conclusions for this case therefore remain unchanged. In Section 4.2 we also wish to correct a typo in Equation (17) of the published article, which should correctly read

$$t_{\text{psyn}}^{\text{obs}} \simeq 9 \times 10^8 B_1^{-2} D_1^{-1} \left(\frac{\gamma}{6 \times 10^6} \right)^{-1} \text{ s}.$$

For the case of a target photon field that is stationary in the active galactic nucleus rest frame (Section 4.3) the proton spectrum normalization (Equation (25)) is correctly constrained to

$$N_0 \gtrsim 1.4 \times 10^{55} D_1^{-4} \Gamma_1^{-2} R_{t,17}^2 \epsilon'_t$$

yielding a proton kinetic jet power (Equation (26)) of

$$L_p \gtrsim 4.7 \times 10^{47} D_1^{-3} R_{t,17}^2 R_{t,16}^{-1} \xi_{0.05} E_{14}^{-1} \text{ erg s}^{-1},$$

which is well within the range plausibly powered by accretion onto a supermassive black hole of mass $3 \times 10^8 M_\odot$ as has been suggested for TXS 0506 + 056. This even relaxes the energetics requirement by a factor of ~ 300 with respect to our original result, thereby supporting the conclusions outlined in the published article.

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