Relativistic wind accretion onto a Schwarzschild black hole

We present an analytic model of relativistic wind accretion onto a Schwarzschild black hole. This model constitutes a general relativistic extension of the classical model of wind accretion by Bondi, Hoyle and Lyttleton (BHL). Just as for BHL, this model is based on the assumptions of steady state, axisymmetry and ballistic motion. Analytic expressions are provided for the wind streamlines while simple numerical schemes are presented for calculating the corresponding accretion rate and density field. The resulting accretion rate is larger in the relativistic model than in the Newtonian BHL one, being two times larger for asymptotic wind speeds $v_\infty \geq 0.4\,\mathrm{c}$ and more than an order of magnitude larger for $v_\infty \geq 0.8\,\mathrm{c}$. We have compared this new relativistic model against numerical simulations performed with *aztekas*, a relativistic hydrodynamic numerical code, and found a qualitatively good agreement for the streamlines in the upstream region of the flow and a good agreement (to within 10 %) for the corresponding accretion rates.