Vortex bubble formation in relativistic electron-positron plasmas

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It is shown that delocalized vortex solitons in relativistic pair (electron-positron) plasmas with small temperature asymmetries can be unstable for intermediate intensities of the background electromagnetic field. Instability leads to the generation of ever-expanding cavitating *bubbles* in which the electromagnetic fields are zero. Though the changes in the core plasma density and temperature are small, the electromagnetic fields are expelled from within the expanding core. The existence of such electromagnetic bubbles is demonstrated by qualitative arguments based on a hydrodynamic analogy, and by numerical solutions of the appropriate Nonlinear Schrödinger Equation with a *saturating nonlinearity*. The formation of such electromagnetic bubbles could have rather interesting implications for structure formation both in cosmic/astrophysical settings, and for pair plasmas that may, soon, be available in laboratory conditions.