Spinor Maxwell Equations in Riemannian Space-Time and Modeling Constitutive Relations

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Abstract: It is known that vacuum Maxwell equations being considered on the background of any pseudo-Riemannin space-time may be interpreted as Maxwell equations in Minkowski space but specified in some effective medium, which constitutive relations are determined by metric of the curved space-time. In that context, we will consider space-time models with event horizon. All of them have a metric of one the

same structure,we restrict ourselves to spherically symmetric case, and consider de Sitter, anti de Sitter, and Schwarzschild models. Also we will study hyperbolic Lobachevsky and spherical Riemann models, parameterized coordinates with spherical and cylindric symmetry. We will prove that in all examined cases, effective tensors and of of electric permittivity (ε_{ij}) and magnetic permeability (μ_{ij}) obey one the same condition: $\varepsilon_{ij}(x)\ \mu_{jk}(x) = \delta_{ik}$.Simplicity of expressions for these tensors $\varepsilon_{ij}(x)$ and $\mu_{jk}(x)$ is misleading, for each of curved space-time model we are to solve Maxwell equations separately and anew. We will construct these solutions explicitly, applying Maxwell equations in spinor form.

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