The known source-free Einstein-Maxwell equations

$$R_{ik} = \kappa \cdot (\frac{1}{4} \ g_{ik}F_{ab}F^{ab} - F_{ia}F_k{}^a) \qquad ,$$

$$F^{ia}{}_{;a} = 0 \qquad ,$$

$$F_{ik} = A_{i,k} - A_{k,i}$$

involve a special kind of Riemannian geometry, what is explained as follows.

The Ricci main directions (written in terms according to Eisenhart) follow from

$$\mathsf{det}|R_{ik} + \rho g_{ik}| = 0$$

with the solutions

$$\rho_{|1} = \rho_{|4} = +\rho_o \qquad , \qquad \rho_{|2} = \rho_{|3} = -\rho_o$$

with

$$\rho_o{}^2 = R_1{}^a R^1{}_a = R_2{}^a R^2{}_a = R_3{}^a R^3{}_a = R_4{}^a R^4{}_a \qquad .$$

Characteristical are the two double-roots, that means: There are two dual surfaces of the congruences $e_{|1}{}^i e_{|4}{}^k - e_{|1}{}^k e_{|4}{}^i$ and $e_{|2}{}^i e_{|3}{}^k - e_{|2}{}^k e_{|3}{}^i$ with extreme mean Riemannian curvature. ($e_{|1}...e_{|4}$ are the vectors of an orthogonal quadrupel in those "main surfaces". At single roots we had 4 main directions.) With it we get

$$g_{ik} = e_{|1\_i}e_{|1\_k} + e_{|2\_i}e_{|2\_k} + e_{|3\_i}e_{|3\_k} - e_{|4\_i}e_{|4\_k} \qquad ,$$

$$\frac{R_{ik}}{\rho_o} = -e_{|1\_i}e_{|1\_k} + e_{|2\_i}e_{|2\_k} + e_{|3\_i}e_{|3\_k} + e_{|4\_i}e_{|4\_k} \qquad .$$

If we set

$$c_{|ik} = -c_{|ki} = F_{ab}e_{|i}{}^{a}e_{|k}{}^{b}$$

follows [elementary calculations snipped]

$$-\kappa\Big((c_{|23})^2 + (c_{|14})^2\Big) = 2\rho_o \qquad ,$$

$$c_{|12} = c_{|34} = c_{|13} = c_{|24} = 0 \qquad .$$

With it, the field tensor

$$F_{ik} = -c_{|14}(e_{|1\_i}e_{|4\_k} - e_{|1\_k}e_{|4\_i}) + c_{|23}(e_{|2\_i}e_{|3\_k} - e_{|2\_k}e_{|3\_i})$$

is performed from the main surfaces !

That works of course solely without sources (in an "electrovacuum"), but it is not the author's problem, because relevant quantities like charge, mass, which one can measure, are integration constants of the above mentioned equations. The Bianchi identities are met always here.

This brief summary was a sample from the works in http://www.markt-2000.de/patent/section2/sc_works.html[1] . It was first published 1980, see literary index in both works. Details about the derivation in the German-language work, pages 33 and 34, about the Ricci main directions in general pages 22 to 24. The latter was drawn from Eisenhart: Riemannian Geometry, Princeton university press. See also solutions relevant for the microcosmos, achieved from computations.

Please take no offence at the author's claim about the sources, because it is well founded with the fact that known values of particles let recognize themselves from the got "electrovacua". These solutions exist independently on that claim !

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[1]This site has been moved to http://bruchholz.psf.net/index.html .

[2]This document has been later composed with LaTeX from a plain text. For it, the text has been negligibly changed