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TITLE: On the behavior of spherically symmetric mass distributions in general relativity theory (II)

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TEXT: The concepts of an R-region and a T-region in space-time with a spherically symmetric space are defined. The properties of these regions are discussed. An R-region is defined as that region of the space-time in which the condition $-g_{00}/g_{11} > (\dot{g}_{22}/g'_{22})^2 = (\mu/\mu')$ is fulfilled. (Vestn. Mosk. un-ta, ser. fiziki, astronomii, no. 5, 1962). A system of coordinates with $g_{22} = r^2$ is possible only in such an R-region. In the T-regions defined by $-g_{00}/g_{11} < (\dot{g}_{22}/g'_{22})^2$ coordinate systems with $e^{\nu} = \psi(\tilde{t})$ are possible. e^{ν} depends on t in any system of reference. The boundary between the R and T-regions is given by the equation $-g_{00}/g_{11} = (\dot{g}_{22}/g'_{22})^2$.
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The coordinate spheres of all reference systems expand in T-regions. The existence of R-regions is evident. The possibility of T-regions to exist follows from two statements: (1) the region $0 < \sqrt{2m}\,(r-t)$ in vacuo is a T-region in the Lemaître system of coordinates; (2) a T-region occurs in vacuo when the radius of the contracting sphere is smaller than its radius of gravitation. When matter is distributed and moving in spherically symmetric fashion (with finite and infinite mass) a regular and finite minimum of volume can exist simultaneously throughout the space. The surface of a sphere is assumed to be in a T-region at time t_0. If this surface contracts in t_0, it will go over into a point after a finite interval of its proper time. A more or less sharp boundary of a spherically symmetric metagalaxy can lie only in a T-region. These considerations hold true probably for the last $3.8 \cdot 10^9$ years. The upper limit of their applicability is $\Delta t \sim 7 \cdot 10^9$ years. If these assumptions are valid then the metagalaxy has expanded during about the last $5 \cdot 10^9$ years.

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