ACTIVITY AS THE RESULT OF MERGING

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The observed correlation between activity and mergers of galaxies may be explained by the compensation of the angular momentum by merging. This leads to accretion on the galaxy centre [2].

The statistical description of the merger process is based on the generalized Smoluchowsky kinetic equation for the galaxy mass and angular momentum distribution $f(M, \mathbf{S}, t)$ [1]. The model allows to find the luminosity function of active objects $\varphi(L, t)$ connected with $f(M, \mathbf{S}, t)$ by the quadratic in f integral relation. It supposes the luminosity–mass excess Δm relation: $L = B \cdot \Delta m$ (mass Δm is able to fall to the centre). The simplest calculation scheme results in the function $\varphi \propto 1/L$, close to the observed one, if the asymptotic expression of the mass function MF $f(M, t) \equiv \int f(M, \mathbf{S}, t) d\mathbf{S} \propto M^{\alpha}$ with $\alpha = -(u + 2)/2$, where u is defined by the dependence of coalescence coefficient $U \propto M^{u}$ on mass. MF with $\alpha = -(u + 2)/2$ corresponds to the approximate conservation of the number of massive galaxies if their interaction with small ones (masses $\sim M_{*}$) prevails.

At $u > 1$ (this value is typical for galaxies in the wide mass interval) the "explosive" evolution occurs — analog of the phase transition of gel formation [4], when the power-type tail of MF is formed during a finite time interval. Accordingly an "explosive" formation of active objects, i.e. the epoch of quasar formation, takes place [3]. On large enough masses $M_f \geq 10^{14} M_{\odot}$ the maximum value of the impact parameter is already limited by the mean free pass length or mean distance between the galaxies. So the mass dependence of the merger cross-section σ and U disappears ($u \to 0$) and the "explosion" stops. This model (assuming an early emergence of small-mass galaxies $M_{*} \sim 10^{6} M_{\odot}$) enables to explain the abrupt disappearance of quasars at $z = z_{cr} \geq 3$.

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