Progress Report

MODELING OF THE PECULIAR NEBULA IN THE LOW-METALLICITY GALAXY NGC 4068

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During the analysis of the gas kinematics in the dwarf low-metallicity galaxy NGC4068 we found a bright star-like object surrounded by a rapidly expanding nebula (which follows from its broadened $H\alpha$ line). The spectra of the object obtained with the 6-meter BTA SAO RAS telescope and at the 2.5-meter CMO SAI MSU telescope show high intensity in the [NII], $H\alpha$, [OIII] lines, peculiarly low [SII]/[NII] ratio and the presence of weak emission in HeII 4686 line.

We tested several assumptions about the nature of the ionizing star, including blue supergiant and Wolf-Rayet stars. We show that the most probable scenario is that we observe the expanding nebula around the Wolf-Rayet star with mass $>70~{\rm M}_{\odot}$. We constructed the models of stellar atmospheres using CMFGEN code and the corresponding photoionization models of the nebula calculated with the Cloudy code and argue that all observational features of the spectra can be described by the model of an expanding bubble around a rapidly rotating Wolf-Rayet star in a short-lived evolutionary stage, which locally enriches the interstellar medium with nitrogen.