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Gas temperature control of low-frequency helium plasma jet using Peltier device for biological experiments[1] SHINJI YOSHIMURA, National Institute for Fusion Science, MITSUTOSHI ARAMAKI, Nihon University, YOKO OTSUBO, National Institute for Fusion Science, National Institute for Basic Biology, AKIRA YAMASHITA, National Institute for Basic Biology, KAZUNORI KOGA, Kyushu University — We are planning to conduct experiments on the biological effects of plasma irradiation to fission yeasts, one of popular model organisms. We adopted a commonly-used low-frequency (LF) helium plasma jet as a plasma source because of its accessibility. In addition to stability and reproducibility of the plasma, which are obviously important for such biological experiments, a good control of the gas temperature is crucial especially when using temperature-sensitive mutants. The gas temperature of an atmospheric-pressure LF plasma jet is generally around room temperature in the initial stage of the discharge. However, the gas temperature in our experimental setup gradually increased with time up to 70 degrees Celsius in one minute. In order to prevent the gas heating, we attempted to actively control the temperature of helium gas supplied to the discharge region by using a Peltier device. A plasma jet with almost constant gas temperature, which is below critical temperature, for more than one minute has successfully been obtained. Some preliminary results of direct plasma jet irradiation to fission yeasts with controlling gas temperature will be presented.

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