High resolution spectroscopy of NGC 7009

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The typical expansion velocity of a planetary nebula is about 20 km s$^{-1}$. Thus the frequently-used low-resolution spectroscopy does not resolve the dynamics of the nebula and the obtained information is scrambled along the line of sight. In this poster we present UVES spectra obtained along the major axis of NGC 7009. The object is resolved both on the sky and along the line of sight. We present analysis of the physical condition of the gas inside the nebula and its relation to the abundance discrepancy factor.
Figure 1a. Location of the slits.

The typical expansion velocity of a Planetary nebula is about 20 km/s. Thus the frequently used low-resolution spectroscopic data are not adequate to resolve the dynamics of the nebula and the astrophysical information is scrambled along the line of sight. In this paper we present high-resolution spectroscopic data obtained with the VLT/UVES spectrograph on NGC7009. TheObject is observed both on the sky and along the line of sight. We present analysis of the physical conditions of the gas inside the nebula. We studied the density and temperature distribution using the Balmer and forbidden recombination lines.

Our results:
1. The approaching and receding walls of the nebula are different. The approaching section is practically isothermal, while the receding one shows a significant temperature gradient, being hotter in the inner region and colder outside.
2. Both regions of the nebula have different in the receding gas.
3. The panel in the middle show the line profiles at different positions. The OII line profile is in black and [OIII] 4959 is in orange. The solid green line is the temperature at the same position. Note that the line profiles of OII and [OIII] lines are more similar and the temperature is more constant.

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