

Three years survey in Local Bubble with Diffuse Interstellar Bands

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The solar neighborhood lies in the middle of an enormous Local Bubble of million degree, ionized hydrogen gas, surrounded by a wall of colder, denser neutral gas. The Local Bubble extends for 100 pc in the plane of Galaxy and for hundreds of parsecs vertically. The conditions in the ISM are typically probed via lines arising from neutral or singly-ionized atoms or molecules. Such atoms or molecules can not survive at the high temperature inside the Local Bubble thus understanding the nature of the Local Bubble faces extra challenges. The Local Bubble can be probed using species which survive under this condition, e.g. Diffuse Interstellar Bands (DIBs). Van Loon et al. (2009) shows that DIBs are seen in the relatively harsh environments such as the Disc-Halo interface. They also shows that a high $\lambda 5780/\lambda 5797$ ratio indicates the existence of an interface between cool/warm and hot gas. The neutral structures within the Local Bubble will be indicative of thermal instabilities leading to cold compact structures immersed within the hot gas.

We conducted a survey using the median resolution spectrograph (IDS) on INT 2.5m telescope. The targets have been selected based on the 3D mapping of dense interstellar gas around the Local Bubble of Welsh et al. (2010). All of selected objects have well-known distance from Hipparcos, spectral type earlier than A5 and mostly have accurate Na I D measurements. The targets are all bright, and isolated stars. We use the H1800V grating which provides a spectral resolution well-matched to the typical width of DIBs and its wavelength coverage includes the major $\lambda 5780$, 5797, 5850, 6196, 6203 & 6269 DIBs. So far around 434 stars have been observed providing a 3D mapping. Our observations reveal the first map of Local Bubble.

References

- [1] [van Loon, Jacco Th., McDonald, Iain](#), 2009, MNRAS .394 831
- [2] [Welsh, Barry](#), 2010, AA 21620 60