THE SNC METEORITES

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The SNC (Shergotty-Nakhla-Chassigny) group, are achondritic meteorites. Of all SNC meteorites recognized up to date, shergottites are the most abundant group. The petrographic study of Shergotty began several years ago when Tschermak, (1872) identified this rock as an extraterrestrial basalt. Oxygen isotopes in SNC meteorites indicate that these rocks are from a single planetary body (Clayton and Mayeda, 1983). Because the abundance patterns of rare gases trapped in glasses from shock melts (e.g., Pepin, 1985) turned out to be very similar to the Martian atmosphere (as analyzed by the Viking landers, Owen, 1976), the SNC meteorites are believed to originate from Mars (e.g. McSween, 1994). Possibly, they were ejected from the Martian surface either in a giant impact or in several impact events (Meyer 2006). Although there is a broad consensus for nakhlites and chassignites being -1.3Ga old, the age of the shergottites is a matter of ongoing debates. Different lines of evidences indicate that these rocks are young (180Ma and 330-475Ma), or very old (> 4Ga). However, the young age in shergottites could be the result of a resetting of these chronometers by either strong impacts or fluid percolation on these rocks (Bouvier et al., 2005-2009). Thus, it is important to check the presence of secondary processes, such as re-equilibration or pressure-induce metamorphism (El Goresy et al., 2013) that can produce major changes in compositions and obscure the primary information. A useful tool, that is used to reconstruct the condition prevailing during the formation of early phases or the secondary processes to which the rock was exposed, is the study of glass-bearing inclusions hosted by different mineral phases. I will discuss the identification of extreme compositional variations in many of these inclusions (Varela et al. 2007-2013) that constrain the assumption that these objects are the result of closed-system crystallization. The question then arises whether these inclusions can be considered reliable samples of the fluid/melt that was originally trapped.

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MORPHOLOGICAL ANALYSIS OF THE TAIL STRUCTURES OF COMET 1P/HALLEY 1910 II

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Eight hundred and eighty six images from September 1909 to May 1911 are analysed for the purpose of identifying and measuring the morphological structures along the plasma tail of 1P/Halley. These images are from the Atlas of Comet Halley 1910 II. A systematic visual analysis revealed 304 wavy structures along the main tail and 164 along the secondary tails, 41 solitons, 13 Swan-like tails, 26 disconnection events (DEs), 166 knots and six shells. In general, it is possible to associate the occurrence of a DE and/or a Swan-Tail with the occurrence of a knot, but the last one may occur independently. It is also possible to say that the solitons occur in association with the wavy structures, but the reverse is not true. The 26 DEs documented in 26 different images allowed the derivation of two onsets of DEs. Both onsets of DEs were determined after the perihelion passage with an average of the corrected velocities Vc equal to (57 ± 15) km/s. The mean value of the corrected wavelength lc measured in 70 different wavy structures is equal to (1.7 ± 0.1) x 10^6 km and the mean amplitude A of the wave (measured in the same 70 wavy structures cited above) is equal to (1.4 ± 0.1) x 10^5 km. The mean value of the corrected cometocentric phase velocity Vpc measured in 20 different wavy structures is equal to (168 ± 28) km/s. The average value of the corrected velocities Vkc of the knots measured in 36 different images is equal to (128 ± 12) km/s. There is a tendency for A and lc to increase with increasing cometocentric distance.

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INTERSTELLAR MEDIUM

DENSITY STRATIFICATION EFFECTS ON THE 3D MODELING OF THE BIPOLAR NEBULA NGC 2346

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The study of planetary nebulae (PNe) is extremely important in order to understand the evolution of low- and intermediate-mass stars. Photoionization codes intent to reproduce the interactions of the central star's radiation with the nebular gas. By using this tool, we are able to determine the physical properties of both: nebula and central star. About 70% of the PNe are ellipticals and bipolars and 20% have round morphologies. The reason why the PNe present so different morphological types is not well understood yet. A well accepted suggestion is that the binary central stars could be partially responsible for the bipolar shapes. Considering that there is only one 3D modeling of a bipolar PN (NGC 6302; Wright et al. 2011, MNRAS, 418, 370) and also because NGC 2346 has a binary system as central star, this PN seems to be an excellent candidate for a 3D detailed modeling. The code used for the modeling process was MOCASSIN (Ercolano, B. et al. 2003, MNRAS, 340, 1136). The density distribution we assumed for NGC 2346 has two components: torus and lobes. We considered the density constant in the torus (n_T) and three different cases in the lobes (n_L): (i) n_L = constant; (ii) $n_L \propto r^{-1}$; and (iii) $n_L \propto r^{-2}$. In our models we have observed that density stratification is essential in order to reproduce the higher ionization stages observed in this nebula. So far, the $n_L \propto r^{-1}$ distribution has given the best agreement between the observed and modeled spectrum.

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G 126.1–0.8–14: A MOLECULAR SHELL RELATED TO SH2-187

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We present a multi-wavelength study of a region where a well defined molecular shell, named G 126.1–0.8–14, is observed. The distance of G 126.1–0.8–14 is about 1 kpc. Based on HI and CO data we analyze the atomic and molecular gas related to the structure and estimate its main physical properties. From the radio continuum and infrared data we analyze whether the emission associated with G 126.1–0.8–14 has a thermal origin. To disentangle the possible origin of the shell, and given the lack of catalogued O-type stars in the area, we observed with GEMINI the spectra of four OB stars located in projection inside the shell, to get their accurate spectral types and distances. The young HII region Sh2-187 is located onto the densest part of this molecular shell. A search for young stellar object candidates (cYSOs) was made using infrared point source catalogs. Several cYSOs are found spread out onto the shell. Based on all the available data, we discuss the possible origin of G 126.1–0.8–14 as well as its role in the formation of a new generation of stars.

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THE BUBBLE N10

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We studied the environment surrounding the infrared bubble N10 in molecular and infrared emission. There is an HII region at the center of this bubble. We investigated J=1-0 transitions of molecules ^{12}CO, ^{13}CO and C^{18}O towards N10. This object was detected by GLIMPSE, a survey carried out between 3.6 and 8.0 μm. We also analyzed the emission at 24 μm, corresponding to the emission of hot dust, with a contribution of small grains heated by nearby O stars. Besides, the contribution at 8 μm is dominated by PAHs (polycyclic aromatic hydrocarbons) excited by radiation from the PDRs of bubbles. In the case of N10, it is proposed that the excess at 4.5 μm IRAC band indicate an outflow, a signature of early stages of massive star formation. This object was the target of observations at the PMO 13.7 m radio telescope. The bubble N10 presents clumps, from which we can derive physical features through the observed parameters. We also intended to discuss the evolutionary stage of the clumps and their distribution. It can lead us to understand the triggered star formation scenario in this region.

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KINEMATIC PROFILES OF NGC 3918 AND NGC 6302 FORM HIGH DISPERSION SPECTRA

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Planetary nebulae have typical expansion velocities between 20 and 40 km/s. Using high dispersion, long slit spectroscopy obtained with the 1.60m telescope and the Coudé spectrograph at Pico dos Dias Observatory (MCT/LNA) in Brazil, we derived the kinematic profiles from forbidden lines for different

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