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Nucleosynthetic contribution of stable and radio - active elements from various sources for Chemical Evolution of Galaxy

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According to present day understanding, Big Bang resulted in the formation of universe at immensely high temperature. As the universe cooled down, primordial nucleosynthesis resulted in the formation of mainly Hydrogen(^{1}H)(∼76%), Helium(^{4}He)(∼24%) with small fraction of ^{2}H , ^{3}He, ^{6}Li and ^{7}Li [1]. All other heavier elements were formed by stars of different masses and ages at various evolutionary stages of their life inside the galaxies. From observational data and theoretical modelling, we know that at the time of the formation of the Solar system the metallicity of ISM gas was around ~ 0.0143 [2]. We have performed the galactic chemical evolution (GCE) simulations for Milky way galaxy using Monte Carlo technique to predict various galactic observables such as Star Formatio Rate (SFR), Supernova rates (SN Ia, SN Ib/c & II), total surface mass density of gas and stars, temporal evolution of Z and [Fe/H] and abundance gradients of elements C, N, O, Mg, Si, Ca, Ti, Fe and Zn [3]. These models have been developed for two and three infall accretion episodes for the gradual accretion of gas onto the galaxy to form Halo, Thick disc and Thin disc. The effect of radial gas inflows and mixing on abundance gradients is also explored in these models.

The abundance trends for short lived radio nuclides (SLRs) (τ<10 Myr) ^{26}Al, ^{36}Cl, ^{41}Ca, ^{53}Mn and ^{60}Fe are also deduced for the galaxy [4]. In the simulations, various formation scenario for solar system are explained by forming stellar clusters in the Solar neighbourhood around $\sim$ 9 Gyr. We have obtained the canonical abundance values of SLRs in the early solar system which mainly came from the massive stars in the clusters. These values are compared with the observational values obtained from the meteoritic samples [6] and gamma ray flux [5].

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