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Light scattering technique is an important tool that has been used to infer information about the size, shape, refractive index etc. of different types of particles. The analytical and numerical basis for describing scattering properties of small particles is formed by the classical electromagnetic theory based on Maxwell's equations. The interaction of the electromagnetic wave with particles disrupts the amplitude and the phase of the incoming photons, thus the departing wavefront becomes encoded with different amplitude and phase. In this paper, we present the design and instrumentation of a modified and improved laser-based light scattering set-up that was used for analysis of small particles ranging from sub- micron to micron range. This low-cost setup was designed and fabricated in the Optoelectronics and Photonics Laboratory, Department of Physics, Tezpur University, Assam, India. The set-up could be used to determine the scattering matrices (Mueller matrix) of small particles at visible wavelengths. The set-up was used to measure scattered light signals from an angle of 10° to 170° for θ, and from 10° to 60° for φ, to subsequently account for recording the volume scattering. We know that the dependence on φ plays a vital role and is taken into account for aligned particles. However, our experimental result for some randomly oriented particles show that the particles may get aligned due to several external factors. Thus it becomes evident that azimuthal dependency cannot be ruled out even for randomly oriented particles in order to obtain the actual scattering profile. Experiments were carried out for different types of particles including biological particles. It is important to mention that the studies of organic molecules may be utilized in interpretation of data obtained from Astrophysical studies on the presence of organic molecules in stellar and interstellar medium. The current estimate of over 100 billion habitable planets suggests that the interstellar clouds being populated with molecular component of biological origin. Computer program based on Mie theory and T-matrix method were used to calculate theoretical values of scattering coefficients which were co-related with experimental results. We know that both Mie theory and T-matrix theory provides solution to the Maxwell's electromagnetic wave equations. Analyses, statement of agreement and disagreement between theoretical and experimental result infer information about the morphology of scattering particles. Among many different applications of light in diverse areas, our work also contributes in characterizing particles using the tool light; making this year significant as "Year of Light".