

The compositions of distant stars, intergalactic molecules, and even the initial abundances of elements before the first stars formed can be determined by optical, radio, and X-ray spectroscopy. Therefore, the gas will be identified from its atomic spectrum, which will be one of the types of noble gases. Optical spectroscopy is routinely used to determine the chemical composition of a substance and determine its physical structure. The basic premise of spectroscopy is that different materials emit and react to different wavelengths (colors) of light in different ways, depending on properties such as temperature and composition.