Classical and optical vacuum metrology: considerations for the future

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Since ancient times, humankind has pondered the concept of vacuum, which has always been linked to fundamental questions about the creation of the universe and life and the subject of both philosophical and scientific studies. The definition of vacuum has evolved over time and has been inextricably linked to the initial assumption that a state of absence of matter could or could not exist. Advances in science and metrology have contributed significantly to the evolution of the concept of vacuum, refining methods and techniques for quantitatively measuring it. Starting with the first classical examples of vacuum measurements, we will retrace the most significant stages that led to the definition of vacuum using innovative optical systems. Such systems can perform measurements based on fundamental constants of physics and ab initio calculations, paving the way for a novel era in vacuum science and metrology.