

Integrated photonics: functionalities enabled by novel layered materials

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Abstract

The scientific community's interest has experienced a massive expansion of the research revolving around layered materials (LM), even much so when it comes to light manipulation. Indeed atomic-thin materials are particularly appealing for their active and passive light manipulation properties in the subwavelength regime. Examples of these properties are, for instance, light generation, modulation and detection. The integration of layered materials with integrated photonic platforms can harness their (tunable) light manipulation properties providing momentum to a field of research that is slowly shifting toward higher technologies readiness levels. This approach has the potential not only to enable novel features but, first and foremost, to unleash performances never achieved before for well-established concepts. Examples of the latter are modulators and detectors: the essential building blocks required to drive the high-speed networking systems into the future. The lecture will give an overview of the LM/thin-film integration techniques. We will explore the LM-enabled plethora of integrated devices: the focus will be on integrated modulators and photodetectors. Last, we will critically discuss future challenges and opportunities.

References

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