

## OPTICAL PROPERTIES OF CHIRPED NANO STRUCTURES

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It is well known that a stack of ultra-thin (1 – 10 nm) birefringent layers twisted into a helicoidal structure (similar to a cholesteric liquid crystal) can act as a highly efficient reflector for circularly polarised light [1, 2, 3]. One disadvantage of these reflectors is their rather limited bandwidth. In this work we investigated the feasibility of broadening the reflectance bandwidth by applying a thickness chirp to the pitch of the structure. The paper will discuss the theory and optical properties of these structures. An example from the animal kingdom, the scarab beetle *Gymnopleurus humanus*, which uses this concept will also be discussed. The exocuticle of this insect exhibits roughly a four fold increase in reflectance bandwidth compared to that of a normal helicoidal structure.

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