Influence of gain on the reflection spectra in widely tunable lasers

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In widely tunable lasers a high side mode suppression and a large quasi-continuos tuning range can only be obtained with a good grating design. Simulations of the new widely tunable twin-guide laser design showed that some modes were skipped and no quasi-continous tuning was obtained due to the influence of the gain on the reflection spectra of the superstructure gratings. We'll introduce an optimization method for the superstructure grating design that eliminates this unwanted gain influence and flattens the reflection spectrum so that a good tuning behavior is guaranteed.

In widely tunable lasers a high side mode suppression and a large quasi-continuous tuning range can only be obtained with a good grating design. In widely tunable twin-guide lasers, the reflectors and the gain section overlap and this causes a different behaviour for the reflectors as compared to passive ones. E.g. using superstructure gratings for DBR lasers, we found that some modes were skipped and no quasi-continuos tuning was obtained due to the influence of the gain on the reflection spectra of the superstructure gratings. Using an optimisation method, we have designed a superstructure grating with a flat reflection spectrum even in the presence of gain, such that a good tuning behaviour can be guaranteed.