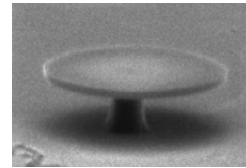


EFFECTIVE INDEX DISPERSION ACCOUNT IN THE COLD MODEL OF DISK RESONATOR WITH UNIFORM GAIN

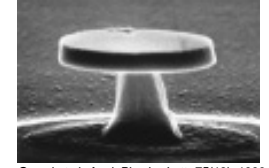
Object of research:

Efficient modelling of promising ultra-low-threshold optical sources with wavelength & sub-wavelength-scale features

- ▶ Semiconductor microdisk lasers of photopump and injection type



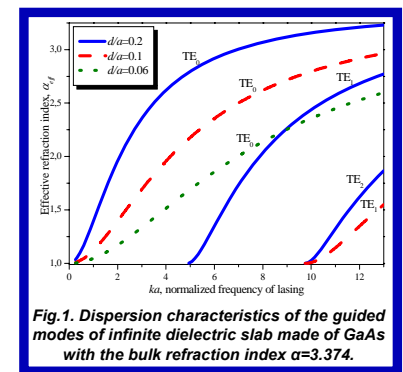
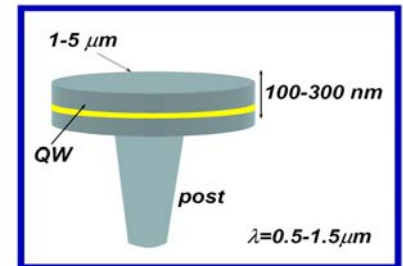
H.Cao et al, *Appl. Physics Lett.*, 76(24), 2000



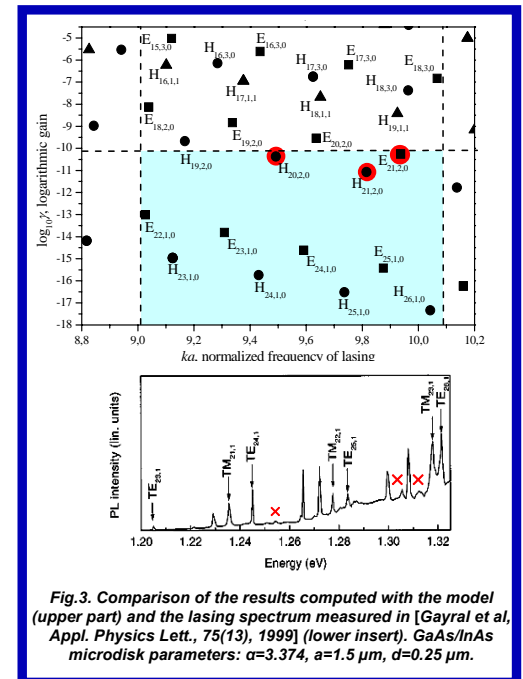
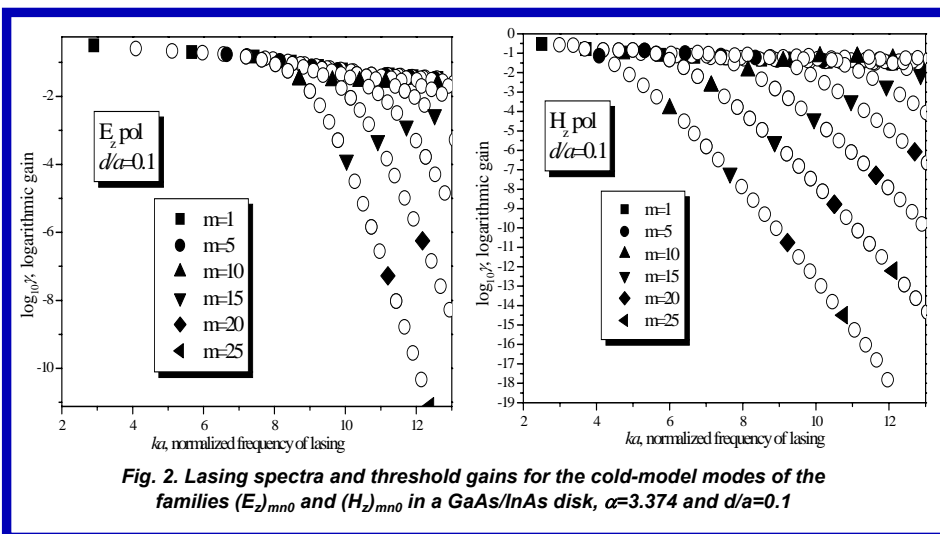
Gayral et al, *Appl. Physics Lett.*, 75(13), 1999

Features of quasi-3D analysis:

- Quantification of the lasing thresholds including WG modes
- Low computer memory requirements
- High accuracy & high speed of computations
- The transparent boundary conditions are satisfied at the disk rim
no rough approximation by a metallized boundary; no ray-like descriptions
- The radiation condition is satisfied implicitly
no non-physical backreflections due to a finite-size computation window as in FD & FEM
- Full account of dispersion of the disk effective refraction index
for each guided mode of the equivalent slab waveguide
- High-order, across the disk, WG modes are accessible
that provides a description of lasing modes in thick disks
- Wavelength-scale microdisks are analyzed accurately
in the region where the ray-optics techniques cannot be used
- Modification for a stratified host medium is under way
enables modelling of microdisk lasers loaded with planar waveguides



Numerical simulations:



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