peak central wavelength are selected. For other positions from *B* to *E*, we obtained $a_{eff\_b\text{-}e}/\lambda$ = 0.841, 0.839, 0.834, and 0.832, respectively.

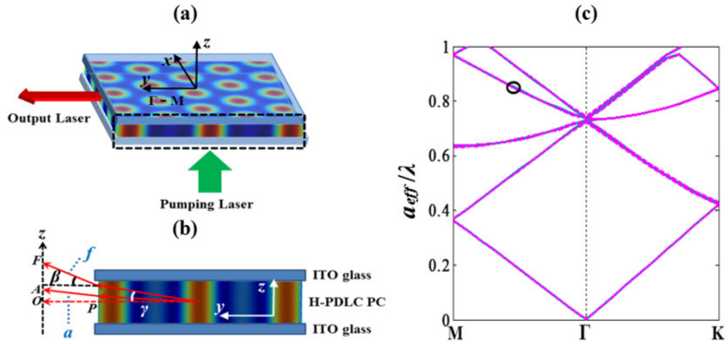

Fig. 4. (a) Structure of the H-PDLC PC sample shown with the directions of pumping and output laser. (b) Cross-section of the *y-z* plane of the H-PDLC PC sample (dash rectangle in (a)). γ and β represents the incident angle in the sample and the output angle outside the sample, respectively. Different laser beams are represented by the solid red lines labeled *a* and *f*. (c) Photonic band structure of the 2D H-PDLC PC with a hexagonal lattice. Both TE and TM polarizations are represented. The lasing generation region is marked by a circle.

From the calculated results, we can see that the normalized frequency fluctuates around 0.837 with a maximum difference of less than 0.6% when the measurement position is displaced from position *A* to *F*, showing a high degree of stability. Considering the inevitable measurement errors in data collection, we can conclude that for all different lasing traces, the a_{eff}/λ is kept almost unchanged, meaning that all the lasing emissions were stimulated under similar conditions, such as group velocity dispersion and local field enhancement. This explanation for spatial angle dependent lasing is reasonable and confirmed by our experiments. Therefore, the red shift in the lasing spectrum, while measured from positions *A* to *F*, should be attributed to the increased effective lattice constant, which in turn stems from an increased incident angle of the laser oscillation trace within the H-PDLC PC sample.

4. Conclusion

In conclusion, we studied and understood the spatial angle dependence of lasing from dye-doped 2D H-PDLC PCs with a hexagonal lattice structure. A red-shifting lasing spectrum is observed with the increasing output angle of the laser beam. The different effective lattice constant of the PC structure experienced by different lasing oscillation traces is found to be the underlying reason of this spatial angle dependent lasing.

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