Temasek Defence Systems Institute

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MODEL FOR ATMOSPHERIC PROPAGATION OF SPATIALLY COMBINED LASER BEAMS

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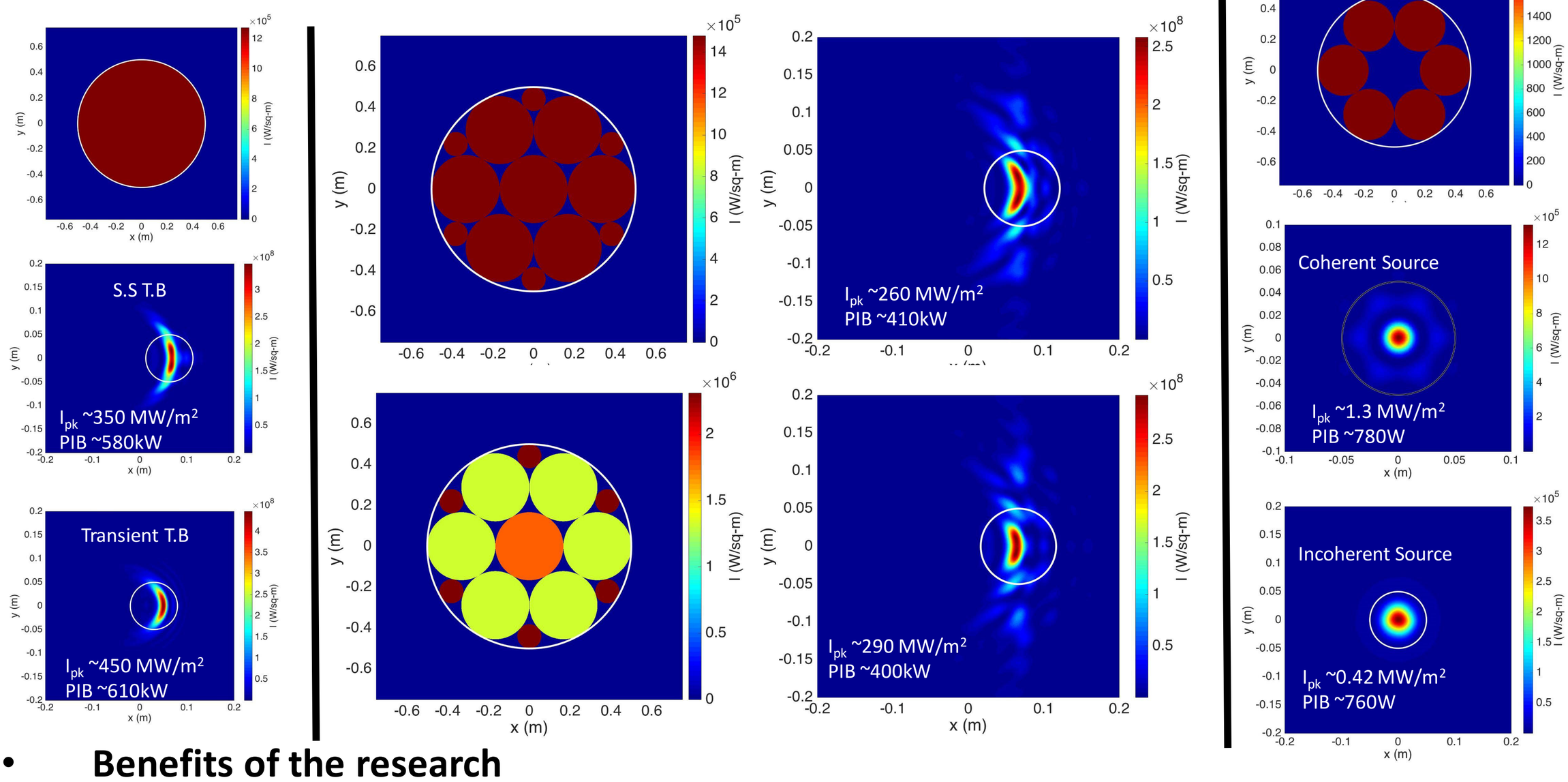
- **Motivation**
  - Desire short dwell time (high irradiance) on target
    - Increase source power to ~MW class
      → No ~MW class solid state laser
      → Combine multiple beams to form ~MW class laser
  - Which beamlet configuration has the highest irradiance on the target?
- **Methodology**
  - Implemented Fourier diffraction code in Matlab
    - Considered steady state thermal blooming (faster than transient thermal blooming model)
    - Compared with analytical results
    - Compared to WaveTrain results provided by Dr. Conor Pogue (transient thermal blooming: $\partial \Delta T / \partial t \neq 0$)
  - Develop transient thermal blooming model and IBC model
- **Results**



- **Benefits of the research**
  - Target irradiance pattern can be obtained for any SBC beam director
    - Power-in-the-bucket and peak irradiance can be obtained for lethality simulation given a specific atmospheric condition.
  - For a specified target, the required dwell time can be obtained

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