**README:**

This project describes an analytical method used to construct the density distribution of gas/plasma from an interferogram. Due to electron and atomic density affecting the shift of fringes, the bending of interference fringe contains density information of gas/plasma. Therefore, the density of gas/plasma can be obtained by processing and analyzing the interference fringe.

There are two main steps to implementation:

1. By extracting the background fringes and the fringes caused by the gas/plasma, the difference between the gas/plasma fringe and the background fringe is expressed as a relative two-dimensional phase shift diagram.
2. The symmetry axis is found by locating the peak value of the fringe, and the gas/plasma density distribution is obtained using the Inverse Abel Transformation based on phase change.

The implementation details are shown in the following flowchart.

Inverse Abel Transformation – Gas

**Images (.bmp format):**

Background fringes, Gas/Plasma induce fringe shift

Extract Background fringes, Gas/Plasma induce fringe shift with single pixel.

2D phase mapping from phase differences on fringes.

Inverse Abel Transformation – Plasma

Locate fringes peaks to set up axial symmetry.

2D Density mapping

**Reference:**

1. Buckingham, A. D., & Graham, C. (1974). The density dependence of the refractivity of gases. Proceedings of the Royal Society of London. A. Mathematical and Physical Sciences, 337(1609), 275-291.