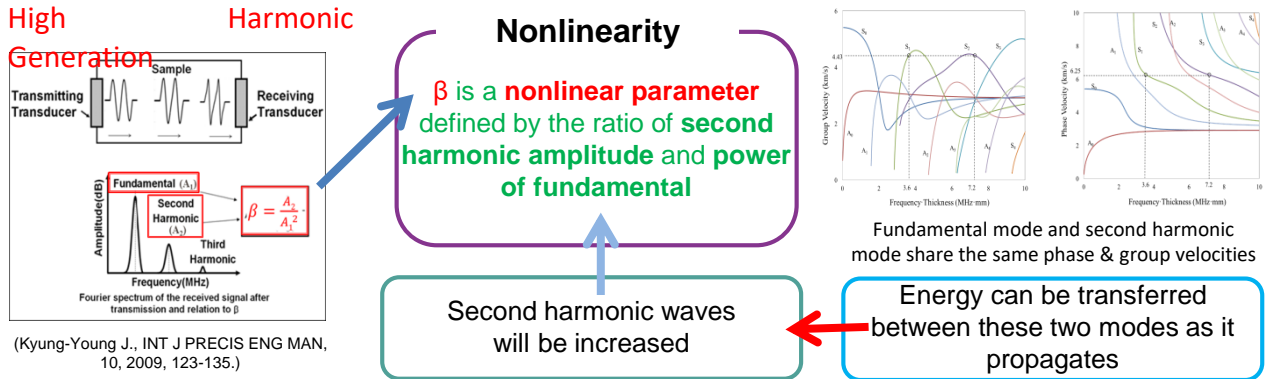


# Evaluation of Fatigue Damages in Aluminum Plates by Nonlinear Ultrasonic Lamb Wave Observed by PS-FBG

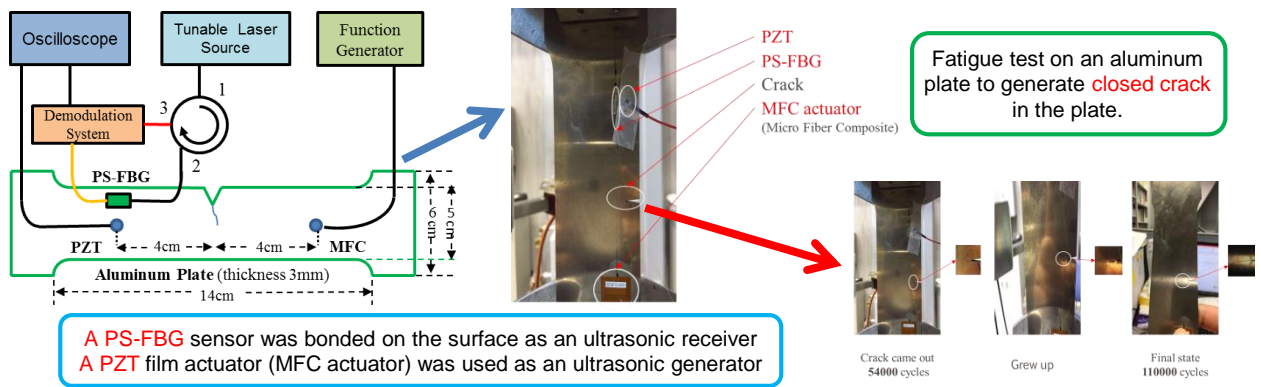
## Background

In the field of non-destructive evaluation, conventional linear ultrasonic methods that use linear amplitude and/or phase variations of reflected, transmitted or scattered ultrasonic waves are effective to detect opened cracks in solid materials. However, their sensitivity is not enough to detect closed cracks. Hence, **nonlinear ultrasonic methods** have been developed for evaluation of **closed cracks** at the early stage of their progresses.

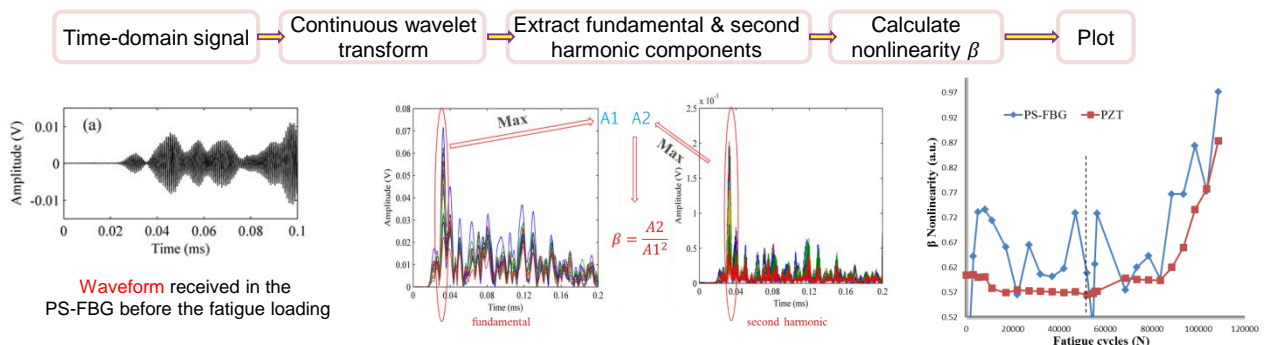
## Nonlinear Ultrasonics



## Experiment



## Data Processing



## Conclusion

**Nonlinear ultrasonic Lamb wave received in PS-FBG is effective to evaluate the progress of closed cracks in aluminum plates.**