

# Beam Emission Spectroscopy (BES)

## Introduction

Beam Emission Spectroscopy (BES) is a diagnostic technique used in plasma physics to measure density fluctuations within a plasma. It works by injecting a neutral beam into the plasma and observing the light emitted as the beam atoms interact with plasma particles. The intensity and spatial distribution of this emission provide valuable information about the local plasma density and its fluctuations, which are important for understanding turbulence and transport phenomena in fusion devices.

acquisition time with fibers 32 channels, 1MHz sampling rate

then using photomultipliers we can get a sampling rates around 100kHz

Two types of cameras:

EM CCD:

ADV: the readout is really uniform, every pixel is going through the same readout channel (one amplifier for all pixels). Good for astrophysics

DIS: much more expensive,

CMOS:

ADV: Cheaper, much faster, no smearing during readout, shorter exposure time (decoupling between exposition and acquisition)

DIS: More noise, non-uniform background, it requires more image processing in analysis.

With 10kHz we must use CMOS

Since our fluctuations are in the order of 100kHz, speaking about time we might not be able to see time correlation. However space correlation can still be seen!

How to trigger camera: Two possibilities: either with same cable but through trigger in the computer, or with a different cable. Going with the first option, inserting trigger in computer...