
HONO by Photofragmentation laser-induced fluorescence
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Photofragmentation laser-induced fluorescence

HONO + hν --> OH + NO λ=354 or 367 nm

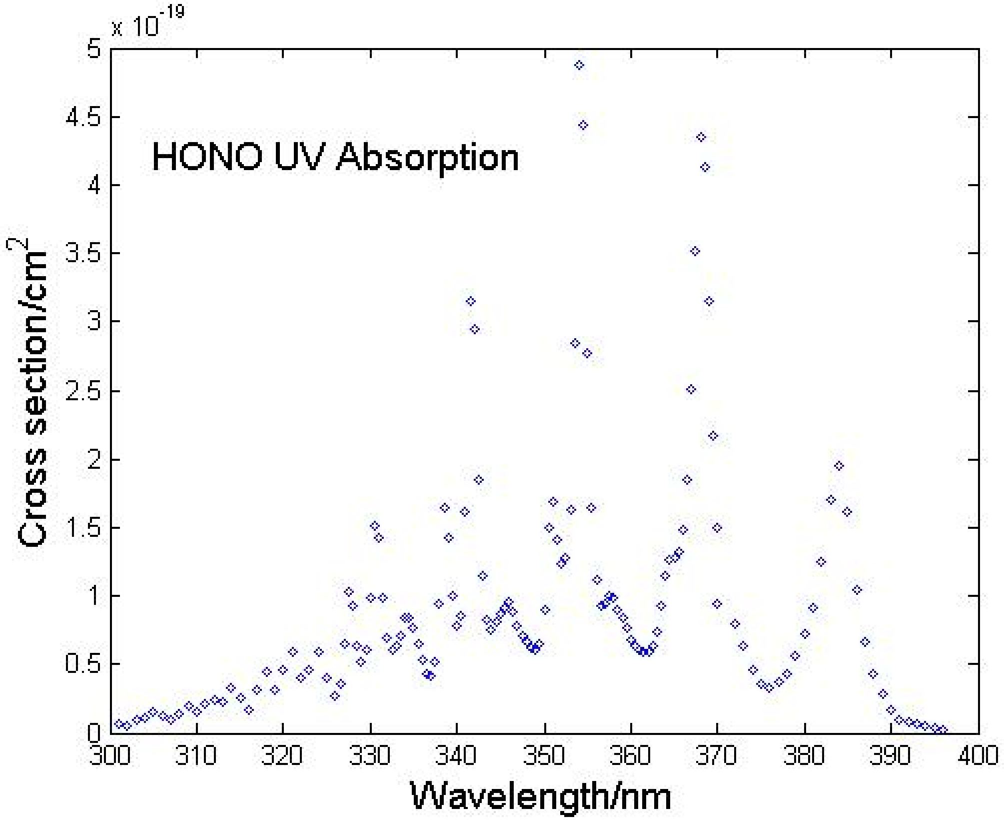
probe OH at 308 nm

background OH low (< 0.5 pptv)

OH LIF well developed

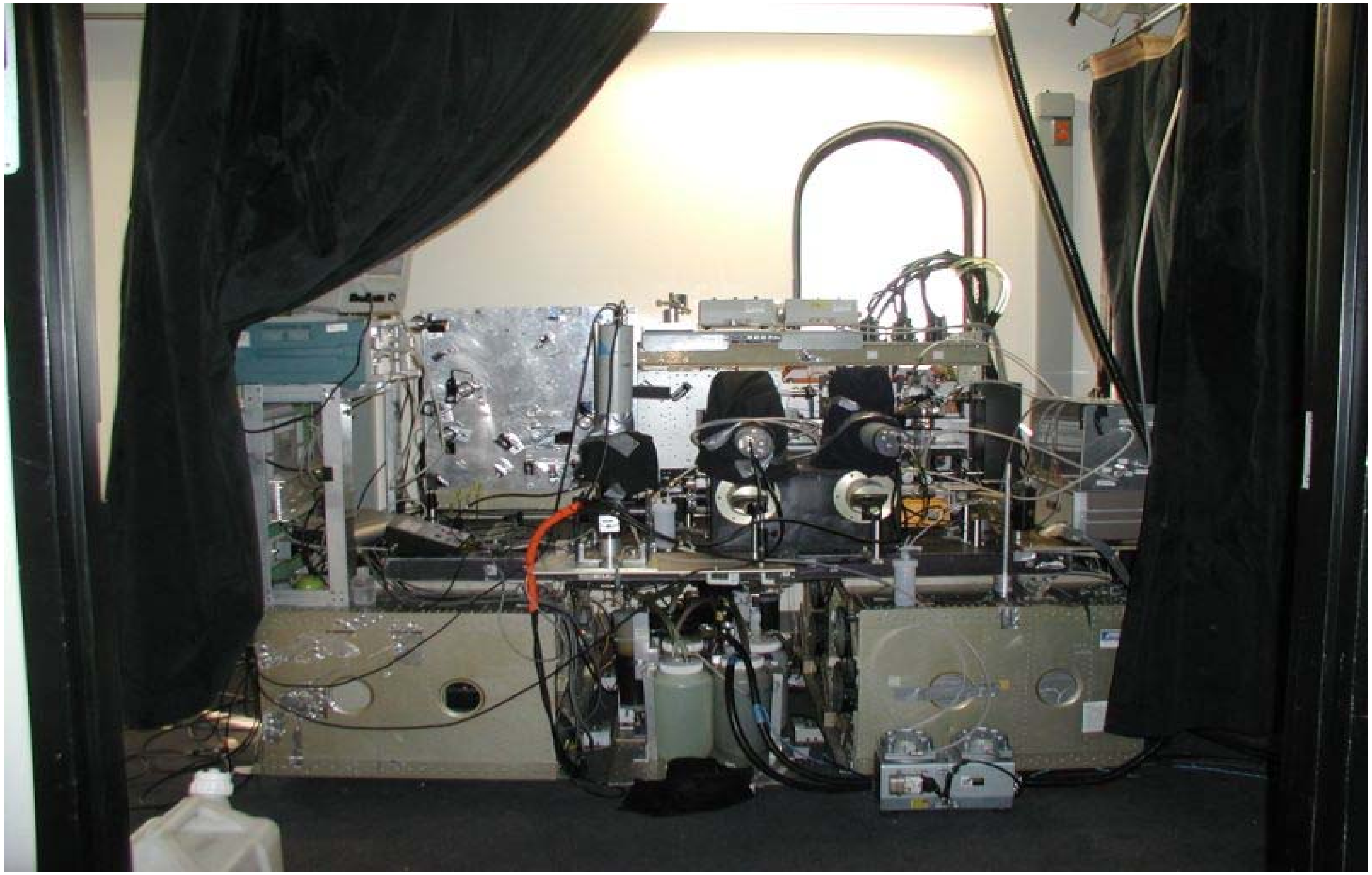
NO background large (10-10000 pptv), high variability

direct spectroscopic assay of HONO competes with NO2



Φ= 0.95

Sander et al, 2006

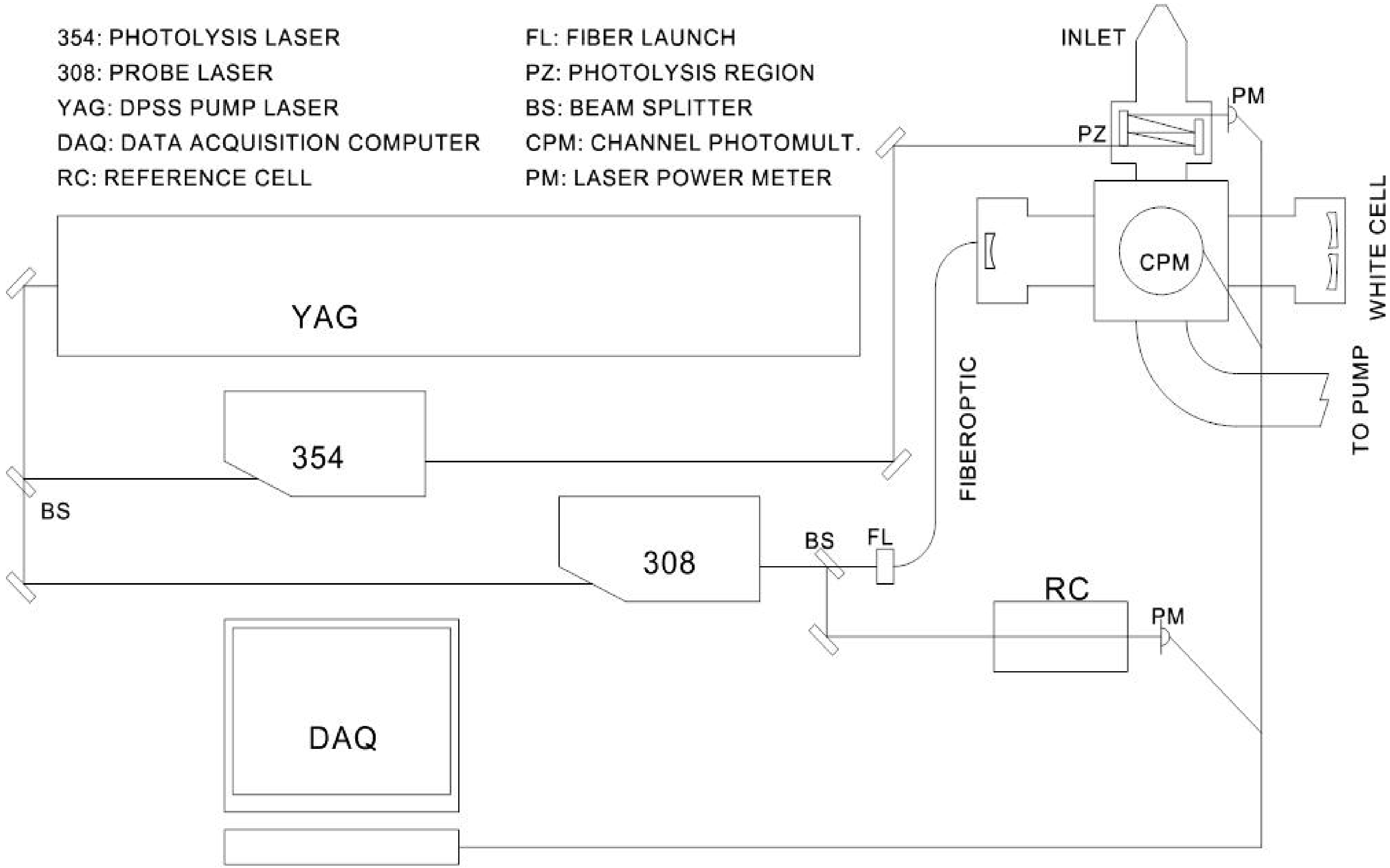


Old way: 10 Hz giant pulse YAGs
282 nm probe, 308 nm detection
~6 pptv/min

pro: spectral filtration

con: ozone background!
big, heavy, demanding

New way: kHz micropulse lasers
FAGE detection in White cells
308 nm probe, 308 nm fluorescence



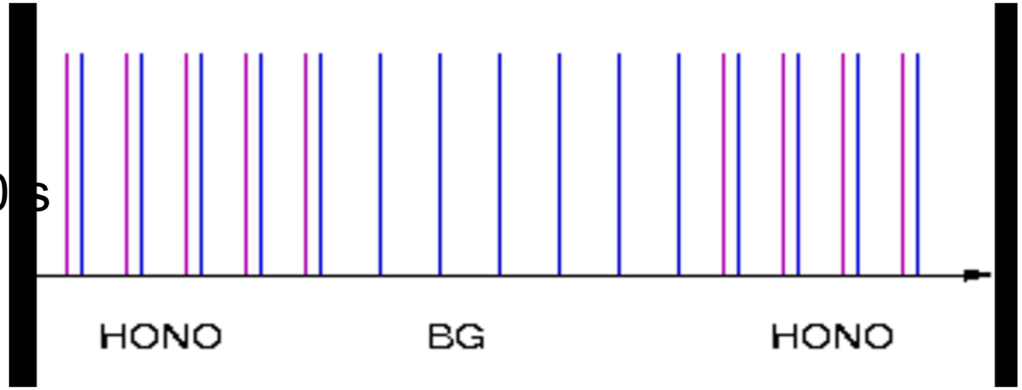
pros: better performance (~1 pptv/min est.)
smaller, lighter, safer
better uptime, more robust

no ozone background
minimal inlet issues (high flow, low pressure)
only interferences are OH photofragments at 354 nm

cons: under construction! (actually modification of existing instrument)
more complex than wet chemical techniques

Acquisition scheme:

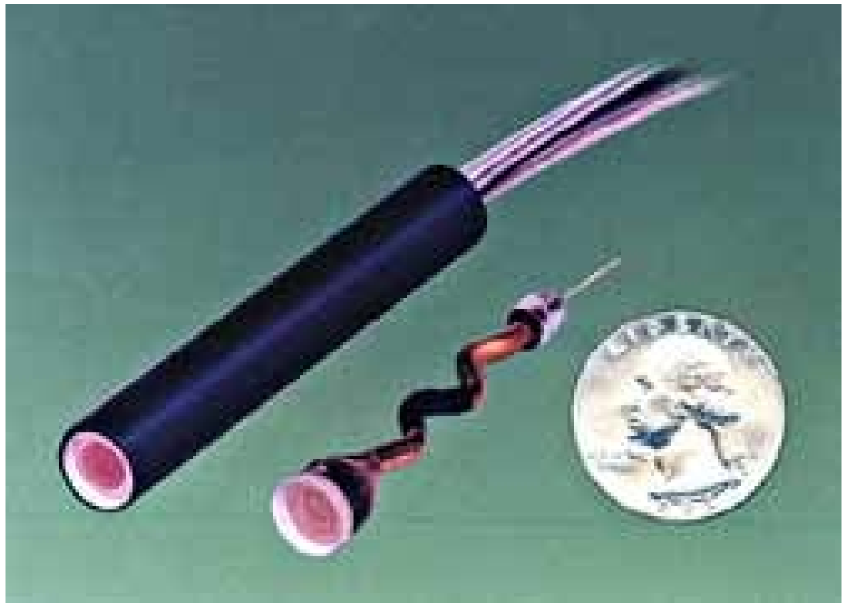
OH always sampled
photolysis alternately
blocked/transmitted every 10 s



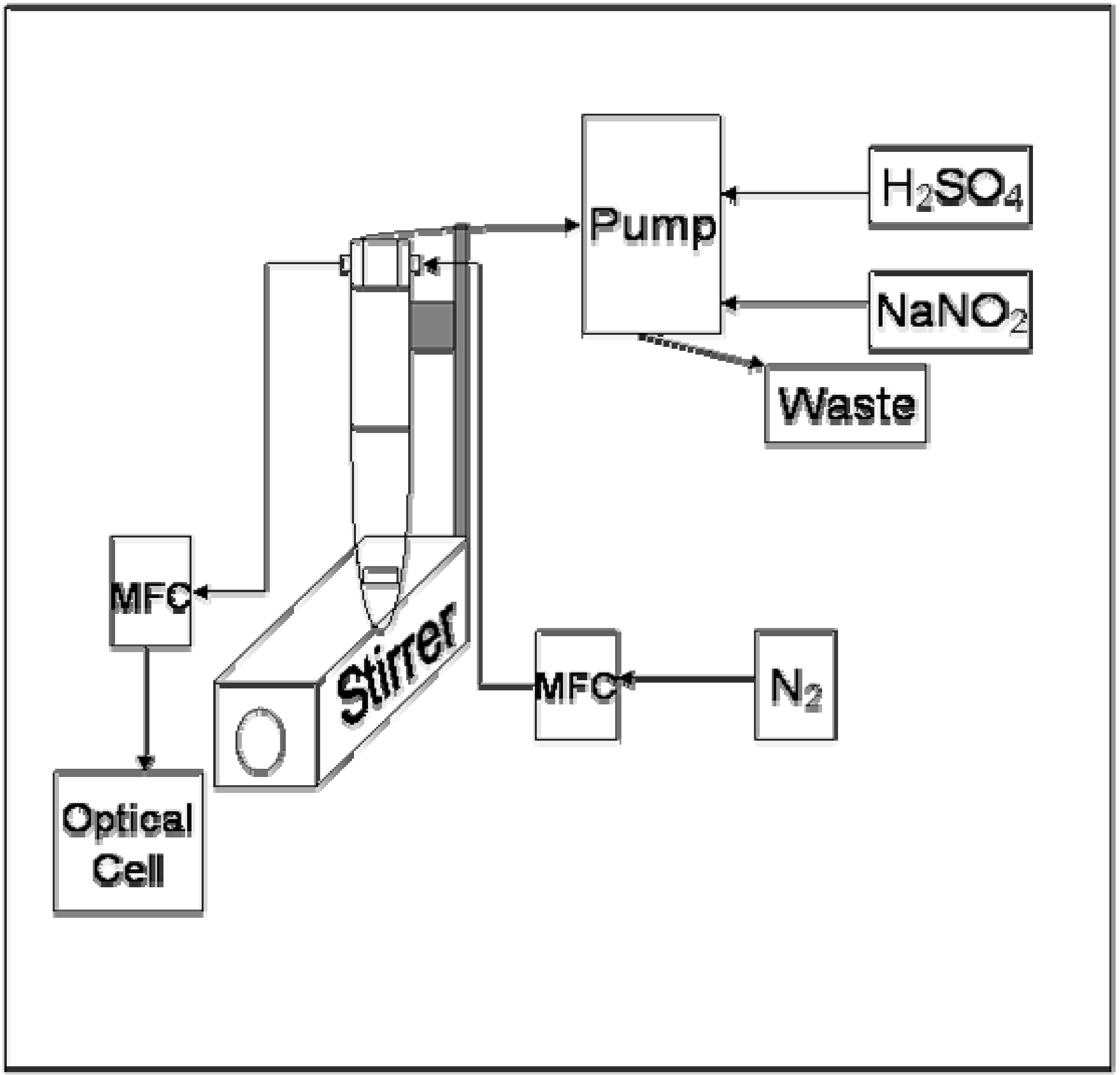
bg includes ambient OH, scatter
any 354nm-generated OH

in principle can acquire OH
concentrations at expense
of acquisition statistics

housekeeping every 10 min



channel photomultipliers should
improve OH performance



calibration setup

similar to ANTCI
constant flow
standard addition