The estimate of the FID signal growth time.

The concentrations of the relevant species are:

The processes that determine the lifetime of $O(^1D)$:
$[H_2O] = 4x10^{15}$, $[O_2]=3x10^{16}$, $[O_3] =2x10^{15}$, all in molecule cm^{-3}.

$O(^1D) + H_2O \rightarrow$ products
$O(^1D) + O_2 \rightarrow$ products
$O(^1D) + O_3 \rightarrow$ products

The rate constants (reaction plus quenching) are $1.8x10^{-10}$, $4x10^{-11}$, and $1.2x10^{-10}$, respectively (all in cm^3 $molecule^{-1}$ s^{-1}).
Therefore, the total pseudo-first order rate constant for $O(^1D)$ atoms decay is
$1.8x10^{-10}$ x $4x10^{15}$ + $4x10^{-11}$ x $3x10^{16}$ + $1.2x10^{-10}$ x $2x10^{15}$ = $2.16x10^6$ s-1.
The inverse of the pseudo-first order rate constant is the lifetime of $O(^1D)$ atoms, which is simultaneously rise time of the FID, is:

$$\tau_{rise} = (2.16x10^6\ s^{-1})^{-1} = 463\ ns.$$

Some details about the numerical modeling of the FID in B= 825 G.

Method of the modeling of the FID in magnetic field described in detail in [1A]. It contains the following steps:
Step 1 - calculating the spectrum in a magnetic field.

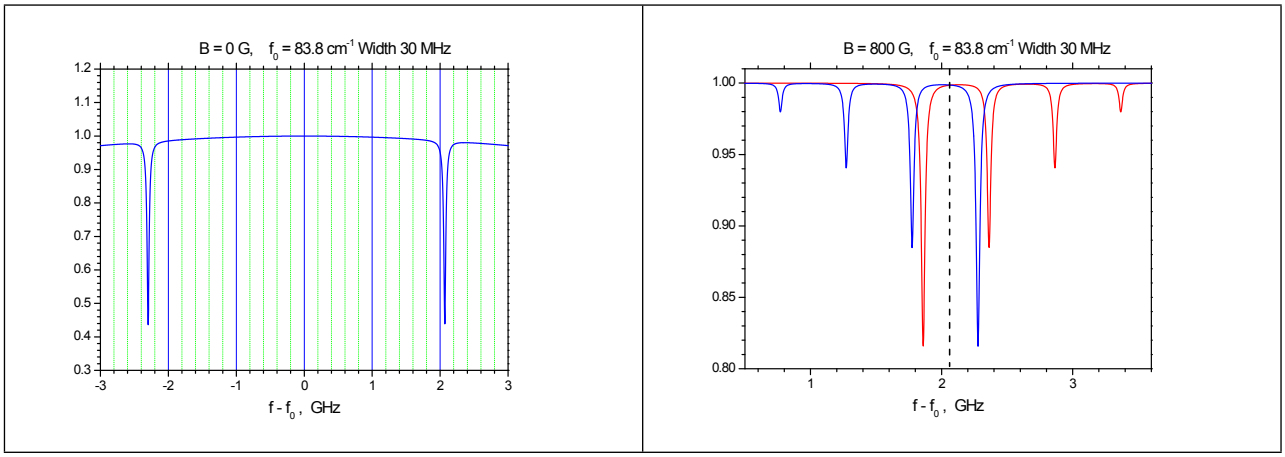

Figure 1A.
Left - Spectra of the $^2\Pi_{3/2}(J=1) \leftarrow {}^2\Pi_{3/2}(J=0)$ doublet near 83.8 cm^{-1}. The linewidth is 30 MHz, that was obtained from the fitting of the decay time of the FID.
Right - The splitting pattern of the one component of the doublet in longitudinal magnetic field B= 825 G. Red line corresponds to the right hand circular polarization, Blue line – left hand.

Step 2 – Calculations of the complex amplitudes of electric field of the FID wave. It were calculated separately for the right hand and the left hand circular polarizations according to expressions 8, 9, 10 and 12 in [1A]. The calculated amplitudes on time are shown in figure 2A

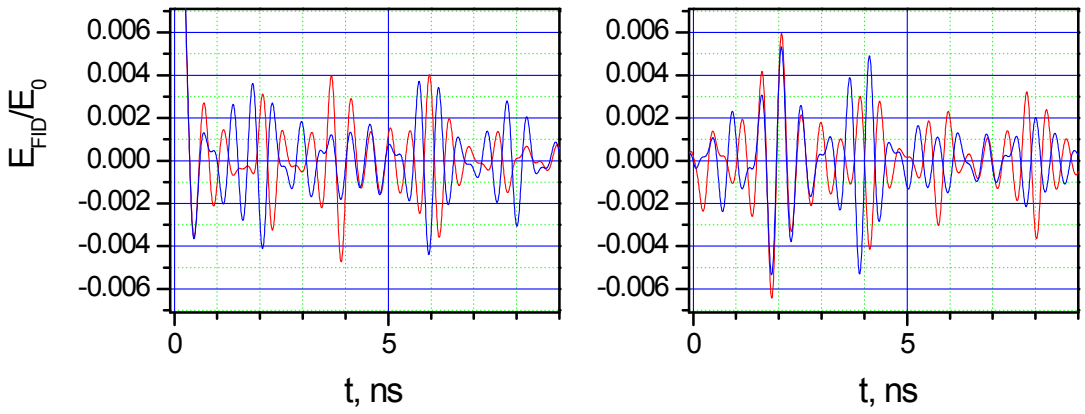

Figure 2A. The complex amplitudes of the FID signals of OH in magnetic field B=825G
Left panel - real parts of the amplitude of electric field, right panel - the imaginary parts.
Right-hand and left-hand circular polarization in magnetic field
are shown by red and blue lines, respectively

Step 3 Calculations of the linear polarized components of the FID wave on time using the expressions 16, 17 in [1A].

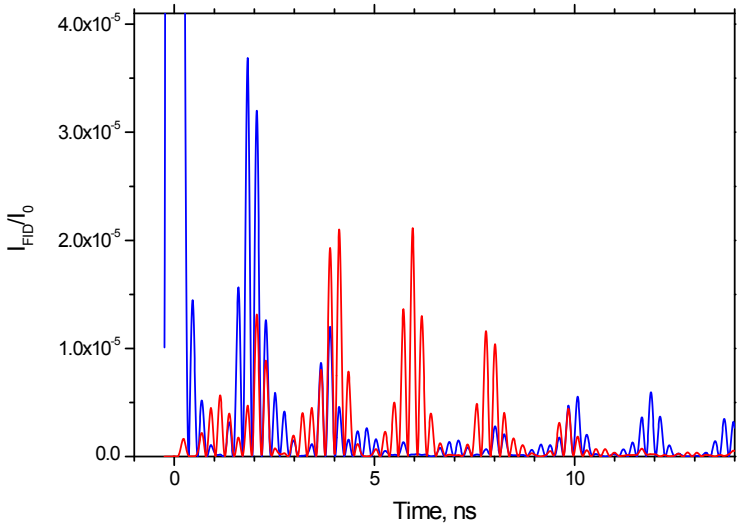

Figure 3A. Intensity of the linear polarized components of the FID wave in magnetic field.
Blue line - polarization coincident with the exciting pulse,
Red line - polarization perpendicular to the exciting pulse

1A. E.N.Chesnokov, L.N. Krasnoperov and V.V. Kubarev, Optical free-induction decay of paramagnetic molecules in magnetic field. *Laser Physics*, 2020, **30**, 015204.