CermitESR(B0, B1, cantilever, f_rf, grid, h, magnet, mw_x_0p, sample)
returns: df_spin
graph: cornell_esr_graph
handler: MemHandler
modifiers:
  - replace_component({'magnet': ['Bz_method', 'Bzxx_method'], 'sample': ['J',
  'Gamma', 'spin_density', 'temperature', 'dB_sat', 'dB_hom'], 'grid':
  ['grid_array', 'grid_shape', 'grid_step', 'grid_voxel', 'extend_grid_method'],
  'cantilever': ['dk_to_df_ac_cermit']})

Simulates a Cornell-style frequency shift magnetic resonance force microscope
  experiment in which microwaves are applied for half a cantilever cyclic to
  saturate electron spin resonance in a bowl-shaped region swept out by the
  cantilever motion.

```
convert microwave x_0p

convert_grid_pts(mw_x_0p, grid_step)
return: ext_pts
functype: callable

Convert distance to ext points.
```

ext_pts

```
extended ogrid

<lambda>(extend_grid_method, ext_pts)
return: ext_ogrid
functype: lambda

Lambda expression: extend_grid_method(ext_pts)
```

ext_ogrid

```
extended sample ogrid

ogrid_sub(ext_ogrid, h)
return: ext_sample_ogrid
functype: callable

Subtraction method used for ogrid.
```

ext_sample_ogrid

```
extended Bz

<lambda>(Bz_method, ext_sample_ogrid)
return: ext_Bz
functype: lambda

Lambda expression: Bz_method(*ext_sample_ogrid)
```

ext_Bz

```
extended B total

add(ext_Bz, B0)
return: ext_B_tot
functype: builtin

Same as a + b.
```

ext_B_tot

```
extended B offset

B_offset(ext_B_tot, f_rf, Gamma)
return: ext_B_offset
functype: callable

Calculate the resonance offset.
```

ext_B_tot

```
B total

slice_matrix(ext_B_tot, grid_shape)
return: B_tot
functype: callable

Slice numpy matrix.
```

ext_B_offset

```
sample ogrid

ogrid_sub(grid_array, h)
return: sample_ogrid
functype: callable

Subtraction method used for ogrid.
```

sample_ogrid

```
minimum absolute x offset

min_abs_offset(ext_B_offset, ext_pts)
return: B_offset
functype: callable

Minimum absolute value of a matrix in x direction
  based on the window.
```

B_tot

B_offset

```
Bzxx

<lambda>(Bzxx_method, sample_ogrid)
return: Bzxx
functype: lambda

Lambda expression: Bzxx_method(*sample_ogrid)Bzxx
```

```
relative polarization change

rel_dpol_sat_steadystate(B_offset, B1, dB_sat,
  dB_hom)
return: rel_dpol
functype: callable

Relative change in polarization for steady-state.
```

```
equilibrium magnetization per spin

mz_eq(B_tot, Gamma, J, temperature)
return: mz_eq
functype: callable

Magnetization per spin at the thermal equilibrium
  using the Brillouin function.
```

rel_dpol

mz_eq

```
spring constant shift

<lambda>(Bzxx, rel_dpol, mz_eq, spin_density,
  grid_voxel)
return: dk_spin
functype: lambda

Lambda expression:  - (Bzxx * rel_dpol * mz_eq *
  spin_density * grid_voxel).sum()
```

dk_spin

```
frequency shift

<lambda>(dk_to_df_ac_cermit, dk_spin)
return: df_spin
functype: lambda

Lambda expression: dk_to_df_ac_cermit(dk_spin)
```