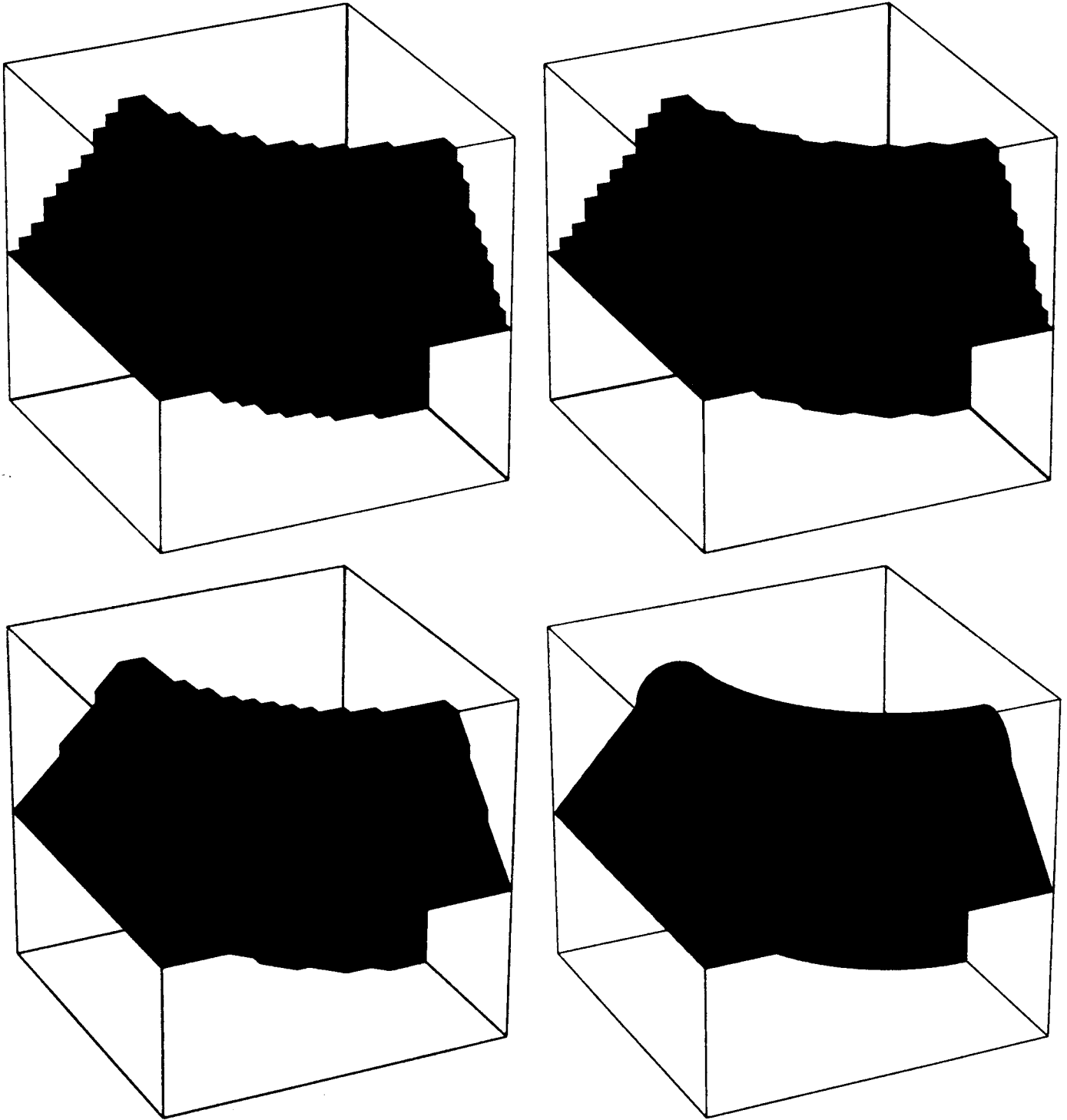


- Improved GdfidL
  - Greatly improved accuracy due to better material discretisation.
  - Improved speed
  - Programmable mesher and postprocessor
  - Periodic boundary conditions in x-, y- and z-direction simultaneously for eigenvalue computations
  - 'Perfectly Matched Layer' as absorbing boundary condition for time domain computations
  
- GdfidL computes
  - Resonant Fields
    - \* Frequencies
    - \* Shunt-Impedances
    - \* Q-Values
  - Time dependent fields
    - \* Scattering parameters
    - \* Wake fields and Wakepotentials

# Better boundary approximation

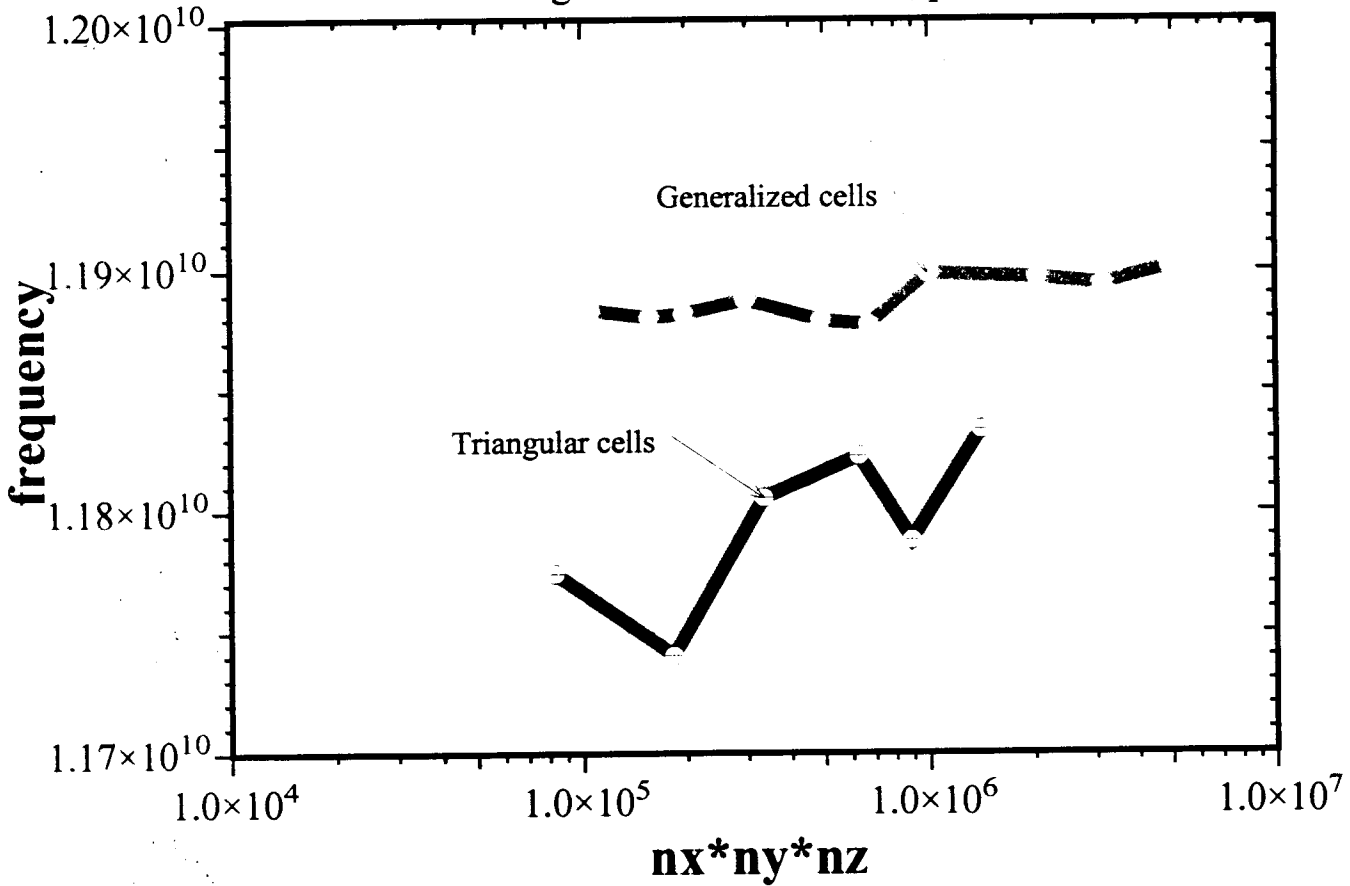


blue: WAFIA 1.4 M meshpoints  
≈ 10h

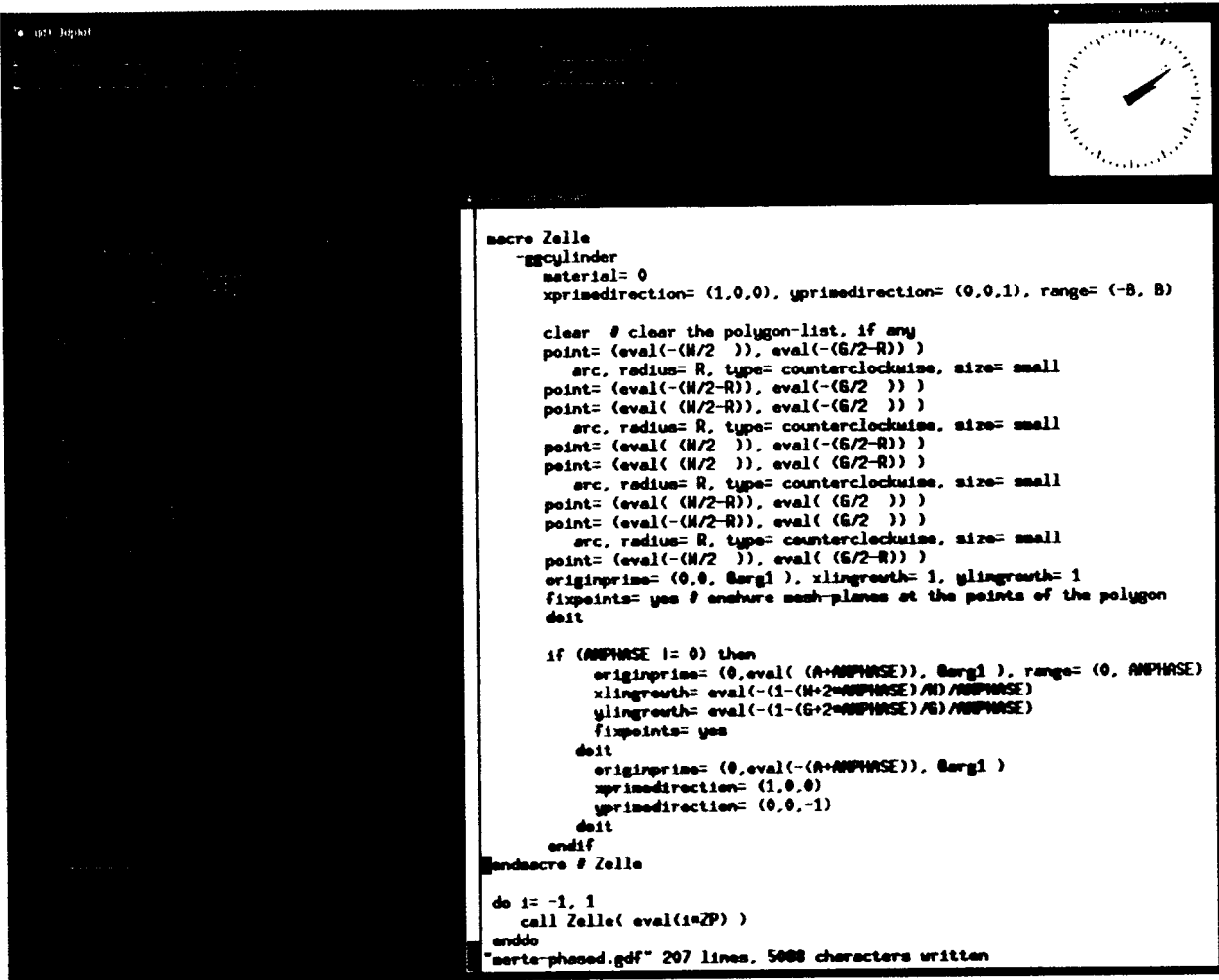
red: generalized 507 meshpoints  
diagonal filling ≈ 10h

### GdfidL

Convergence for a DDS-Cell, pi-mode



# Programmable mesher and postprocessor



```
macr Zelle
  -cylinder
  material= 0
  xprimedirection= (1.0,0), yprimedirection= (0,0,1), range= (-B, B)

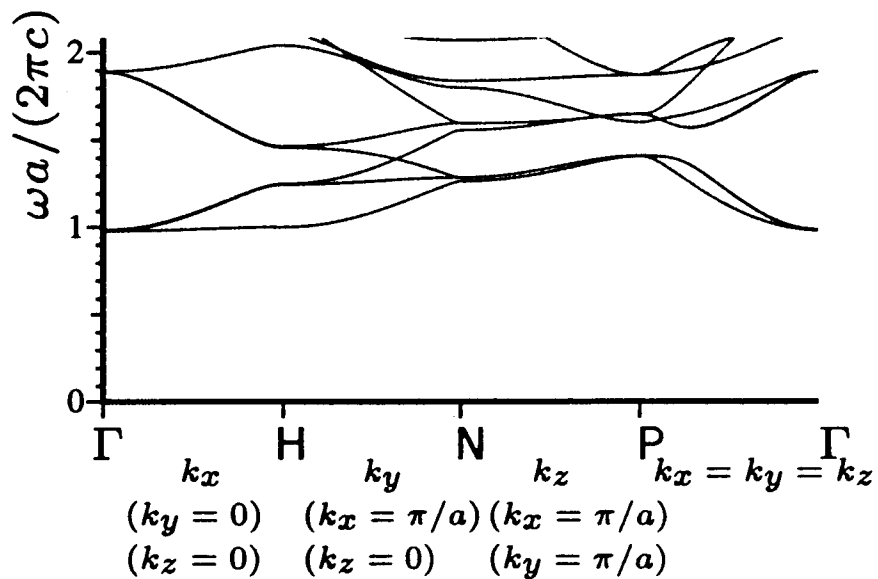
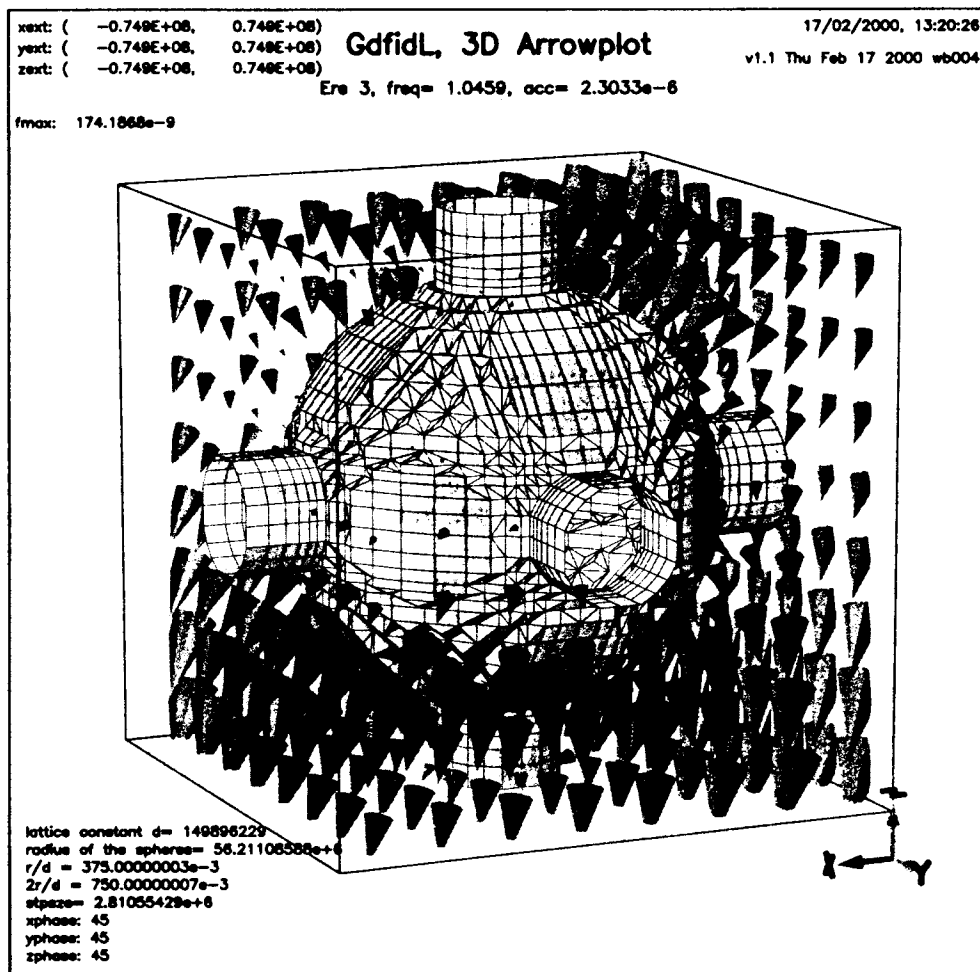
  clear # clear the polygon-list, if any
  point= (eval(-(M/2 )), eval(-(G/2-R)))
  arc, radius= R, type= counterclockwise, size= small
  point= (eval(-(M/2-R)), eval(-(G/2  )))
  point= (eval( (M/2-R)), eval(-(G/2  )))
  arc, radius= R, type= counterclockwise, size= small
  point= (eval( (M/2  )), eval(-(G/2-R)))
  point= (eval( (M/2  )), eval( (G/2-R)))
  arc, radius= R, type= counterclockwise, size= small
  point= (eval( (M/2-R)), eval( (G/2  )))
  point= (eval(-(M/2-R)), eval( (G/2  )))
  arc, radius= R, type= counterclockwise, size= small
  point= (eval(-(M/2  )), eval( (G/2-R)))
  originprime= (0,0, Garg1 ), xlingreuth= 1, ylingreuth= 1
  fixpoints= yes # anshure mesh-planes at the points of the polygon
  doit

  if (ANPHASE != 0) then
    originprime= (0,eval( (A+ANPHASE)), Garg1 ), range= (0, ANPHASE)
    xlingreuth= eval(-(1-(M+2*ANPHASE)/M)/ANPHASE)
    ylingreuth= eval(-(1-(G+2*ANPHASE)/G)/ANPHASE)
    fixpoints= yes
    doit
    originprime= (0,eval(-(A+ANPHASE)), Garg1 )
    xprimedirection= (1,0,0)
    yprimedirection= (0,0,-1)
  endif
endmacr # Zelle

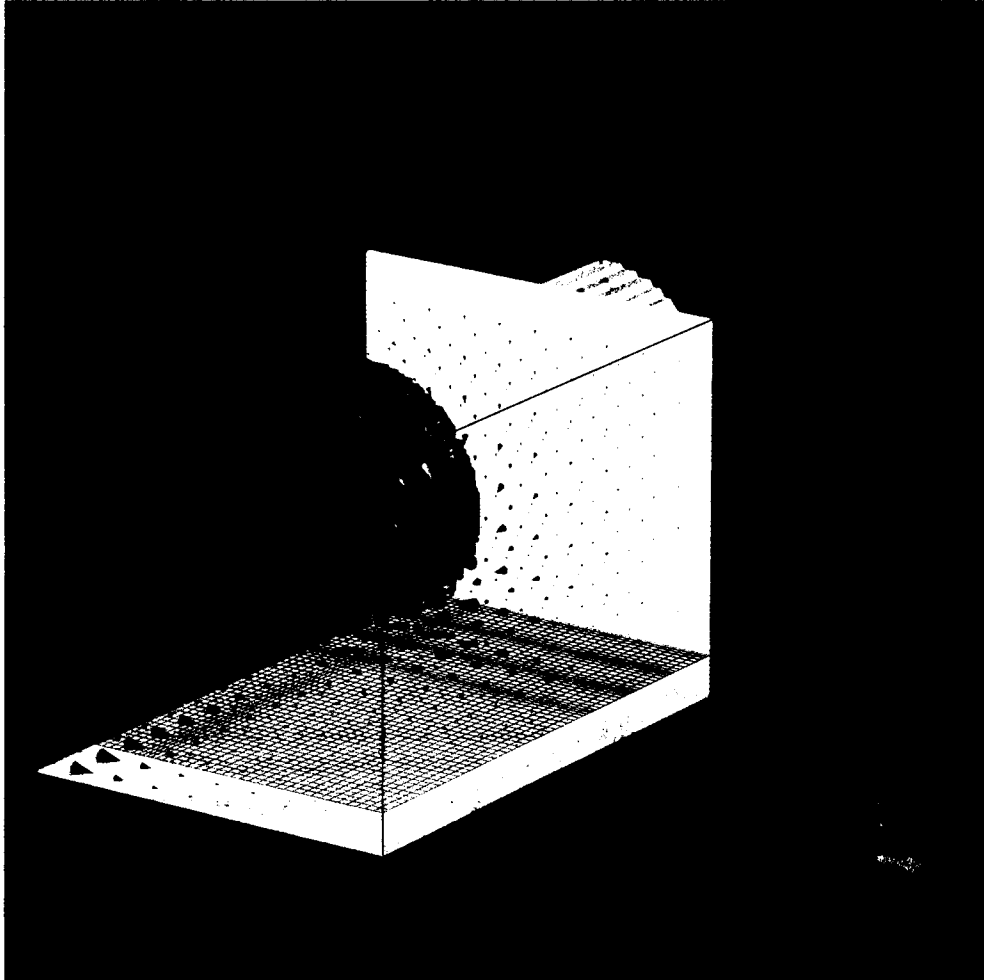
do i= -1, 1
  call Zelle( eval(i*ZP) )
enddo
"verts-phased.gdf" 207 lines, 5000 characters written
```

- do-loops
- if then / endif
- macros with parameters

# Periodic boundary conditions in x- y- and z-direction



# Perfectly Matched Layer



'Perfectly Matched Layers' are used as absorbing boundary conditions. It is no longer needed to specify a sufficiently large number of orthogonal modes to have low reflection.

Ports can be inhomogeneously filled with dielectrics.