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OCMS supplementary document for Waseda Univ.: Helmholtz equation for the Schrödinger-Bloch model

The Helmholtz equation for the Schrödinger-Bloch (SB) model differs from that for the Maxwell-Bloch model. For studying the former using the OCMS package, the user needs to include “waseda-build-params.mk” in addition to “build-params.mk” when building executable files as follows:

```
$ make all params=$workspace/build-params.mk extras=$workspace/waseda-build-params.mk
```

Here we assumed that both “build-params.mk” and “waseda-build-params.mk” are prepared in the work space directory (i.e., $workspace). A template file of “build-params.mk” is found in $ocms/templates/{SYM0, SYM1, SYM2, SYM4}, and that of “waseda-build-params.mk” is found in $ocms/.

The default content of “waseda-build-params.mk” is given as follows:

```
#
# waseda-build-params.mk
#

#=======================
# Dispersion relation
#=======================
# When CUSTOMIZED is selected, the dispersion relation must be defined in
# defined in def_nk.F.
# STANDARD is the default and fallback mode.
DISPERSION = STANDARD # Standard dispersion relation (i.e., omega=ck)
#DISPERSION = CUSTOMIZED # Non-standard dispersion relation (defined in def_nk.F)
```

When the user wants to study the SB model version of the Helmholtz equation, the variable DISPERSION must be set to CUSTOMIZED as follows:

```
#DISPERSION = STANDARD # Standard dispersion relation (i.e., omega=ck)
DISPERSION = CUSTOMIZED # Non-standard dispersion relation (defined in def_nk.F)
```

This change affects the file “def_nk.F”, whose default content is given as follows:

```
C=============================================
C     Definition of the dispersion relation
C=============================================
#if defined(CUSTOMIZED)
C
C     Non-standard dispersion relation
C
C     (Ex) Schroedinger-Bloch model case
C          nk = 2*k + 1              (inside the cavity)
C          nk = 2*k + (nout/nin)^2   (outside the cavity)
C
      nk_in=cdsqrt(2d0*k+1d0)      ! Inside the cavity
      nk_out=cdsqrt(2d0*k+
     &     dble(nout)*dble(nout)
     &     /dble(nin)/dble(nin))   ! Outside the cavity
*
#else
C
C     Standard dispersion relation
C
C     nk = n * k
C
      nk_in=dble(nin)*k    ! Inside the cavity
      nk_out=dble(nout)*k ! Outside the cavity
*
#endif
```

By setting DISPERSION = CUSTOMIZED, the non-standard dispersion relation for the Helmholtz equation is selected, which is by default set to the dispersion relation corresponding to the SB model.