```
<HEADER>
OBSERVATION_FILE_NAME=S10B001_PILASTNAME.OPE
OBSERVATION_FILE_TYPE=OPE
OBSERVATION_START_DATE=2010.11.01
OBSERVATION_START_TIME=18:00:00
OBSERVATION_END_DATE=2010.11.02
OBSERVATION_END_TIME=07:00:00
</HEADER>

<PARAMETER_LIST>

########################################
#    DO NOT EDIT THE TWO LINES BELOW.
########################################
DEF_FMOS_SPEC=OBE_ID=FMOS OBE_MODE=SPEC
DEF_FMOS_SUBR=OBE_ID=FMOS OBE_MODE=SUBROUTINE


##################################################################
#    LIST NAMES & COORDINATES OF YOUR TARGET FIELDS.
#    Note:
#      This is not for commands but just for sky monitor.
##################################################################
SSA22=OBJECT=SSA22 RA=221700.00 DEC=+001900.00 EQUINOX=2000.0
```

← Replace the file name, date & time with those for observation (approximation is OK for date & time) in this header part.

!!ATTENTION!! - Important convention in OPE file:
ANY=PARA1=*** PARA2=xxx …
→ This is substituting "PARA1=*** PARA2=xxx …" entirely to a variable "ANY". Later, this set of parameters is referred as "$ANY" in a command.

Lines starting with "#" are for comments.

↑ "Sky monitor" is a GUI to display current locations of objects/target fields on the sky which is used in the Subaru summit control room. Simply write down names and target coordinates here in the above format. Add lines as necessary for more than one target fields following the same format.

```
###########################################
#    LIST S2O FILE NAMES FOR SETUPFIELD.
#    Note:
#      "NBS" - Normal Beam Switching
#      "CBS" - Cross Beam Switching
#      "PAS" - Point & Stare
###########################################
S2O_SSA22_NBS=S2O=S10A_001_PILASTNAME_SSA22_NBS.S2O
S2O_SSA22_CBS=S2O=S10A_001_PILASTNAME_SSA22_CBS.S2O
S2O_SSA22_PAS=S2O=S10A_001_PILASTNAME_SSA22_PAS.S2O
```

← Put S2O file names used in your observation. .

```
###################################################################
#    COMMANDS FOR ON-SKY OBSERVATION.
#    (Observers may edit parameters for their observations.)
###################################################################

## JUST TO LOAD S2O FILE

LOADS2O              $DEF_FMOS_SPEC $S2O_SSA22_CBS

## JUST TO CHECK SKY CONDITION

CHECKSKY             $DEF_FMOS_SPEC $S2O_SSA22_CBS NCH=1 NOTEL=0
```

• LOADS2O is just to load the S2O file to the instrument control system. CHECKSKY additionally checks the sky condition of the target field by pointing the telescope and taking images of CCS.
• Replace "$S2O_SSA22_CBS" with yours. Add lines as necessary in the same format for more than one target fields.

```
##  NORMAL BEAM SWITCHING

# IF FOCUSING IS NECESSARY:
SETUPFIELD        $DEF_FMOS_SPEC $S2O_SSA22_NBS MAXIT_HOME=1 MAXIT_OBJ=4 NCH=1 OBSD=0
EXEC              FMOS ECH_CHECK_FOCUS $S2O_SSA22_NBS MINFOC=4.0 MAXFOC=4.5 NPOINTS=6
SETUPFIELD        $DEF_FMOS_SPEC $S2O_SSA22_NBS MAXIT_HOME=0 MAXIT_OBJ=3 NCH=3 NOTEL=1 OBSD=0
# IF FOCUSING IS NOT NECESSARY:
SETUPFIELD        $DEF_FMOS_SPEC $S2O_SSA22_NBS MAXIT_HOME=1 MAXIT_OBJ=7 NCH=3 OBSD=0
# ALWAYS WORTH TAKING A SHORT TEST EXPOSURE ...
GETOBJECTN        $DEF_FMOS_SPEC NEXP1=1 EXPTIME1=0 MODE1=CDS NEXP2=0 OBJECT=TEST
# TAKE EXPOSURES WITH BEAM SWITCHING:
NORMALBS          $DEF_FMOS_SPEC BS_DRA1=10 BS_DDEC1=-10 NBS=2 NEXP1=1 EXPTIME1=900 MODE1=RAMP NEXP2=0 OBJECT=SSA22_NBS
# CORRECTION SHOULD BE APPLIED TO FIBER POSITION EVERY ~30 MIN.
SETUPFIELD        $DEF_FMOS_SPEC $S2O_SSA22_NBS MAXIT_HOME=0 MAXIT_OBJ=3 NCH=3 NOTEL=1 OBSD=0
```

Check if the information in "$S2O …" is given correctly.

• SETUPFIELD moves the telescope, configures fibers, does field acquisition and starts auto guiding. Usually observers need to edit none of the parameters but the "$S2O_..." part, where the correct S2O file information is mandatory.

• ECH_CHECK_FOCUS is for a focusing operation. MINFOC and MAXFOC define the scanning range of focus values and NPOINTS specifies the number of sampling points. SS handles them at a night.

• NORMALBS is to take exposures with the telescope dithered in the NBS mode. BS_DRA1 & BS_DDEC1 are the parameters to specify the dithering scale in RA & DEC respectively, in the unit of arcsec. Observers can make lines of NORMALBS with different combinations of BS_DRA1 & BS_DDEC1 for a preferred dithering pattern. They can also specify a phrase for "OBJECT" FITS header keyword in the parameter "OBJECT=…" here.

```
##  CROSS BEAM SWITCHING

# IF FOCUSING IS NECESSARY:
SETUPFIELD        $DEF_FMOS_SPEC $S2O_SSA22_CBS MAXIT_HOME=1 MAXIT_OBJ=4 NCH=1 OBSD=0
EXEC              FMOS ECH_CHECK_FOCUS $S2O_SSA22_CBS MINFOC=4.0 MAXFOC=4.5 NPOINTS=6
SETUPFIELD        $DEF_FMOS_SPEC $S2O_SSA22_CBS MAXIT_HOME=0 MAXIT_OBJ=3 NCH=3 NOTEL=1 OBSD=0
# IF FOCUSING IS NOT NECESSARY:
SETUPFIELD        $DEF_FMOS_SPEC $S2O_SSA22_CBS MAXIT_HOME=1 MAXIT_OBJ=7 NCH=3 OBSD=0
# ALWAYS WORTH TAKING A SHORT TEST EXPOSURE ...
GETOBJECTN        $DEF_FMOS_SPEC NEXP1=1 EXPTIME1=0 MODE1=CDS NEXP2=0 OBJECT=TEST
# TAKE EXPOSURES WITH BEAM SWITCHING:
CROSSBS           $DEF_FMOS_SPEC $S2O_SSA22_CBS NBS=2 NEXP1=1 EXPTIME1=900 MODE1=RAMP NEXP2=0 OBJECT=SSA22_CBS
# CORRECTION SHOULD BE APPLIED TO FIBER POSITION EVERY ~30 MIN.
SETUPFIELD        $DEF_FMOS_SPEC $S2O_SSA22_CBS MAXIT_HOME=0 MAXIT_OBJ=3 NCH=3 NOTEL=1 OBSD=0

##  POINT & STARE

# IF FOCUSING IS NECESSARY:
SETUPFIELD        $DEF_FMOS_SPEC $S2O_SSA22_PAS MAXIT_HOME=1 MAXIT_OBJ=4 NCH=1 OBSD=0
EXEC              FMOS ECH_CHECK_FOCUS $S2O_SSA22_PAS MINFOC=4.0 MAXFOC=4.5 NPOINTS=6
SETUPFIELD        $DEF_FMOS_SPEC $S2O_SSA22_PAS MAXIT_HOME=0 MAXIT_OBJ=3 NCH=3 NOTEL=1 OBSD=0
# IF FOCUSING IS NOT NECESSARY:
SETUPFIELD        $DEF_FMOS_SPEC $S2O_SSA22_PAS MAXIT_HOME=1 MAXIT_OBJ=7 NCH=3 OBSD=0
# ALWAYS WORTH TAKING A SHORT TEST EXPOSURE ...
GETOBJECTN        $DEF_FMOS_SPEC NEXP1=1 EXPTIME1=0 MODE1=CDS NEXP2=0 OBJECT=TEST
# TAKE EXPOSURES:
GETOBJECTN        $DEF_FMOS_SPEC NEXP1=3 EXPTIME1=900 MODE1=RAMP NEXP2=0 OBJECT=SSA22_PAS
# CORRECTION SHOULD BE APPLIED TO FIBER POSITION EVERY ~30 MIN.
SETUPFIELD        $DEF_FMOS_SPEC $S2O_SSA22_PAS MAXIT_HOME=0 MAXIT_OBJ=3 NCH=3 NOTEL=1 OBSD=0
```

- Same command sequence as in the former page, but those for CBS and PAS mode. CROSSBS (GETOBJECTN) is used here instead of NORMALBS to take exposures with (without) the telescope dithered, respectively. CROSSBS takes care of not only dithering but also switching guide star set depending on the telescope position (all the necessary information is in an S2O file).

```
############################################################
#    COMMANDS FOR FLAT, ARC, & DARK DATA ACQUISITION.
#    (Observers may edit the parameters for their observations.)
############################################################
```

(This part is for commands to take domeflat, arc, and dark data. Details of these commands are skipped here because observers usually do not need to edit them.)

```
#####################################################
#    BELOW ARE COMMANDS TO TEST THE INSTRUMENT.
#    NO NEED TO EDIT.
#####################################################
```

(This part is for commands to test & check, so details are skipped here because observers do not need to edit them.)