```
%12 = \text{sext i} 32 \% 6 \text{ to i} 64
                                                                                                                                                     %13 = icmp slt i64 %12, 32
                                                                                                                                                     %14 = select i1 %13, i64 %12, i64 32
                                                                                                                                                     %15 = \text{sext i} 32 \% 5 \text{ to i} 64
                                                                                                                                                     %16 = icmp slt i64 %15, 8
                                                                                                                                                     %17 = select i1 %16, i64 %15, i64 8
                                                                                                                                                     %mul.i.i = shl i64 %8, 5
                                                                                                                                                     %mul3.i.i = shl i64 %9, 3
                                                                                                                                                     %idxprom.i = sext i32 %4 to i64
                                                                                                                                                      %arrayidx.i = getelementptr inbounds float, float* %0, i64 %idxprom.i
                                                                                                                                                     %18 = icmp ugt i64 \%14, 1
                                                                                                                                                     %umax = select i1 %18, i64 %14, i64 1
                                                                                                                                                     %19 = icmp ugt i64 %17, 1
                                                                                                                                                     %umax4 = select i1 %19, i64 %17, i64 1
                                                                                                                                                     %20 = add nsw i64 %umax, -1
                                                                                                                                                     %21 = shl i64 \%8, 5
                                                                                                                                                     %22 = trunc i64 %9 to i32
                                                                                                                                                     %23 = mul i32 %22, %6
                                                                                                                                                     %24 = \text{shl i} 32 \%23, 3
                                                                                                                                                     %25 = zext i32 \%24 to i64
                                                                                                                                                     %26 = add i64 %21, %25
                                                                                                                                                     %27 = zext i32 \%6 to i64
                                                                                                                                                     %28 = add nsw i64 %umax, -1
                                                                                                                                                     %29 = \text{shl } i64 \%8, 5
                                                                                                                                                     %30 = trunc i64 %9 to i32
                                                                                                                                                     %31 = mul i32 %30, %6
                                                                                                                                                     %32 = shl i32 %31, 3
                                                                                                                                                     %33 = \text{zext i} 32 \% 32 \text{ to i} 64
                                                                                                                                                     %34 = add i64 %29, %33
                                                                                                                                                     %35 = \text{zext i} 32 \% 6 \text{ to i} 64
                                                                                                                                                     %36 = shl i32 %30, 3
                                                                                                                                                     %37 = add i32 \%36, -1
                                                                                                                                                     %38 = mul i32 %37, %6
                                                                                                                                                     %39 = \text{zext i} 32 \% 38 \text{ to i} 64
                                                                                                                                                     %40 = \text{shl } i64 \%8, 5
                                                                                                                                                      %41 = add i64 %40, %39
                                                                                                                                                     br label %pregion for entry.pregion for init.i
                                                                                                                                                      pregion for entry.pregion for init.i:
                                                                                                                                                      \%\overline{42} = \overline{mul} i64 \% local id y.0, \%35
                                                                                                                                                       %43 = add i64 %34, %42
                                                                                                                                                      %44 = trunc i64 %43 to i32
                                                                                                                                                       %45 = add i64 %41, %42
                                                                                                                                                       %46 = trunc i64 %45 to i32
                                                                                                                                                       %47 = \text{mul } i64 \% \text{ local } id y.0, \%27
                                                                                                                                                       %48 = add i64 \% \overline{2}6, \% \overline{4}7
                                                                                                                                                       %49 = trunc i64 %48 to i32
                                                                                                                                                       %add6.i.i = add i64 % local id y.0, %mul3.i.i, !llvm.access.group !12
                                                                                                                                                       %conv2.i = trunc i64 %add6.i.i to i32, !llvm.access.group !12
                                                                                                                                                       %mul.i = mul nsw i32 %conv2.i, %6, !llvm.access.group !12
                                                                                                                                                       %cmp6.i = icmp eq i32 %conv2.i, 0, !llvm.access.group !12
                                                                                                                                                       %sub.i = add nsw i32 %conv2.i, -1
                                                                                                                                                       %mul22.i = mul nsw i32 %sub.i, %6
                                                                                                                                                      br i1 %cmp6.i, label %pregion_for_entry.entry.i.us.preheader, label
                                                                                                                                                       ... %pregion for entry.entry.i.preheader
                                                                                                                                                                               pregion\_for\_entry.i.preheader:
                      pregion for entry.entry.i.us.preheader:
                      %min.iters.check = icmp ult i64 %umax, 32
                                                                                                                                                                                %min.iters.check17 = icmp ult i64 %umax, 8
                                                                                                                                                                               br i1 %min.iters.check17, label %pregion for entry.entry.i.preheader36,
                     br i1 %min.iters.check, label %pregion_for_entry.entry.i.us.preheader35,
                      ... label %vector.scevcheck
                                                                                                                                                                               ... label %vector.scevcheck25
                                                                                                        F
                                                                                                                                                                                                                                                                  F
                                                                                                                                                                                                             vector.scevcheck25:
                                                                                                                                                                                                              %50 = trunc i64 %28 to i32
                                                                                                                                                                                                             %51 = add i32 %44, %50
                                                                                                                                                                                                              %52 = icmp slt i32 %51, %44
                                               vector.scevcheck:
                                                                                                                                                                                                              %53 = icmp ugt i64 %28, 4294967295 %54 = or i1 %52, %53
                                                %80 = trunc i64 %20 to i32
                                               %81 = add i32 %49, %80
                                               %82 = icmp slt i32 %81, %49
                                                                                                                                                                                                              %55 = trunc i64 %28 to i32
                                               %83 = icmp ugt i64 %20, 4294967295
                                                                                                                                                                                                              %56 = add i32 %46, %55
                                               \%84 = \text{ or } i1 \%82, \%83
                                                                                                                                                                                                              %57 = icmp slt i32 %56, %46
                                                                                                                                                                                                             %58 = icmp ugt i64 %28, 4294967295
%59 = or i1 %57, %58
                                               br i1 %84, label %pregion for entry.entry.i.us.preheader35, label %vector.ph
                                                                                                                                                                                                              \%60 = \text{ or i } 1 \%54, \%59
                                                                                                                                                                                                              br i1 %60, label %pregion for entry.entry.i.preheader36, label %vector.ph26
                                                                                                                                                                                                                                                                    vector.ph26:
                                                                                                           vector.ph:
                                                                                                            %n.vec = and i64 %umax, -32
                                                                                                                                                                                                                                                                     %n.vec28 = and i64 %umax, -8
                                                                                                            br label %vector.body
                                                                                                                                                                                                                                                                     br label %vector.body16
                                                                  vector.body:
                                                                  %index = phi i64 [ 0, %vector.ph ], [ %index.next, %vector.body ] %85 = add i64 %index, %mul.i.i, !llvm.access.group !12
                                                                                                                                                                                                                        vector.bodv16:
                                                                  %86 = trunc i64 %85 to i32, !llvm.access.group !12
%87 = load float, float* %arrayidx.i, align 4, !tbaa !15, !llvm.access.group
                                                                                                                                                                                                                        %index29 = phi i64 [ 0, %vector.ph26 ], [ %index.next30, %vector.body16 ] %61 = add i64 %index29, %mul.i.i, !llvm.access.group !12
                                                                                                                                                                                                                         %62 = trunc i64 %61 to i32, !llvm.access.group !12
                                                                   .. !12
                                                                                                                                                                                                                         %63 = add nsw i32 %mul.i, %62, !llvm.access.group !12 %64 = sext i32 %63 to i64, !llvm.access.group !12
                                                                  %broadcast.splatinsert = insertelement <8 x float> undef, float %87, i32 0
                                                                  %broadcast.splat = shufflevector <8 x float> %broadcast.splatinsert, <8 x
                                                                                                                                                                                                                         %65 = getelementptr inbounds float, float* %2, i64 %64, !llvm.access.group
                                                                   ... float> undef, <8 x i32> zeroinitializer
                                                                  %broadcast.splatinsert8 = insertelement <8 x float> undef, float %87, i32 0
                                                                                                                                                                                                                         .. !12
                                                                  %broadcast.splat9 = shufflevector <8 x float> %broadcast.splatinsert8, <8 x
                                                                                                                                                                                                                         \%66 = bitcast float* \%65 to <8 x float>*
                                                                   ... float> undef, <8 x i32> zeroinitializer
                                                                                                                                                                                                                         %wide.load = load <8 x float>, <8 x float>* \%66, align 4, !tbaa !15,
                                                                  %broadcast.splatinsert10 = insertelement <8 x float> undef, float %87, i32 0 %broadcast.splat11 = shufflevector <8 x float> %broadcast.splatinsert10, <8
                                                                                                                                                                                                                         ..!llvm.access.group!12
                                                                                                                                                                                                                         %67 = fpext <8 x float> %wide.load to <8 x double>, !llvm.access.group !12
                                                                                                                                                                                                                         %68 = getelementptr inbounds float, float* %3, i64 %64, !llvm.access.group
                                                                   ... x float> undef, <8 x i32> zeroinitializer
                                                                  %88 = load float, float* %arrayidx.i, align 4, !tbaa !15, !llvm.access.group
                                                                  ...!12
                                                                                                                                                                                                                         \%69 = bitcast float* \%68 to < 8 x float>*
                                                                  %broadcast.splatinsert12 = insertelement <8 x float> undef, float %88, i32 0
                                                                                                                                                                                                                         %wide.load33 = load <8 x float>, <8 x float>* \%69, align 4, !tbaa !15,
                                                                                                                                                                                                                         ...!llvm.access.group!12
%70 = add nsw i32 %mul22.i, %62,!llvm.access.group!12
                                                                  %broadcast.splat13 = shufflevector <8 x float> %broadcast.splatinsert12, <8
                                                                  ... x float> undef, <8 x i32> zeroinitializer
                                                                  %89 = add nuw nsw i32 %mul.i, %86, !llvm.access.group !12
                                                                                                                                                                                                                         %71 = sext i32 %70 to i64, !llvm.access.group !12
                                                                  %90 = sext i32 %89 to i64, !llvm.access.group !12
                                                                                                                                                                                                                         %72 = getelementptr inbounds float, float* %3, i64 %71, !llvm.access.group
                                                                  %91 = getelementptr inbounds float, float* %2, i64 %90, !llvm.access.group
                                                                  ...!12
                                                                                                                                                                                                                         \%73 = bitcast float* \%72 to <8 x float>*
                                                                   \%92 = bitcast float* \%91 to <8 x float>*
                                                                                                                                                                                                                         \%wide.load34 = load <8 x float>, <8 x float>* \%73, align 4, !tbaa !15,
                                                                  store <8 x float> %broadcast.splat, <8 x float>* %92, align 4, !tbaa !15,
                                                                                                                                                                                                                         ..!llvm.access.group!12
                                                                                                                                                                                                                         %74 = fsub <8 x float> %wide.load33, %wide.load34, !llvm.access.group !12
                                                                   ..!llvm.access.group!12
                                                                  %93 = getelementptr inbounds float, float* %91, i64 8
                                                                                                                                                                                                                         %75 = fpext <8 x float> %74 to <8 x double>, !llvm.access.group !12
                                                                  %94 = bitcast float* %93 to <8 x float>*
                                                                                                                                                                                                                         \%76 = \text{call} < 8 \text{ x double} > \text{@llvm.fmuladd.v8f64} (< 8 \text{ x double} > \%75, < 8 \text{ x double} > 
                                                                  store <8 x float> %broadcast.splat9, <8 x float>* %94, align 4, !tbaa !15,
                                                                                                                                                                                                                         ... <double -5.000000e-01, double -5.000000e-01, double -5.000000e-01, double
                                                                                                                                                                                                                        ... -5.000000e-01, double -5.000000e-01, double -5.000000e-01, double
                                                                   ..!llvm.access.group!12
                                                                  %95 = getelementptr inbounds float, float* %91, i64 16 %96 = bitcast float* %95 to <8 x float>*
                                                                                                                                                                                                                        ... -5.000000e-01, double -5.000000e-01>, <8 x double> %67), !llvm.access.group
                                                                                                                                                                                                                         %77 = fptrunc <8 x double> %76 to <8 x float>, !llvm.access.group !12
                                                                  store <8 x float> %broadcast.splat11, <8 x float>* %96, align 4, !tbaa !15,
                                                                   .. !llvm.access.group !12
                                                                                                                                                                                                                         \%78 = bitcast float* \%65 to < 8 x float>*
                                                                  %97 = getelementptr inbounds float, float* %91, i64 24
                                                                                                                                                                                                                         store <8 x float> %77, <8 x float>* %78, align 4, !tbaa !15,
                                                                  %98 = bitcast float* %97 to <8 x float>*
                                                                                                                                                                                                                         ...!llvm.access.group!12
                                                                  store <8 x float> %broadcast.splat13, <8 x float>* %98, align 4, !tbaa !15,
                                                                                                                                                                                                                         %index.next30 = add i64 %index29, 8
                                                                                                                                                                                                                         %79 = icmp eq i64 %index.next30, %n.vec28
                                                                   ...!llvm.access.group!12
                                                                  %index.next = add i64 %index, 32
                                                                                                                                                                                                                         br i1 %79, label %middle.block14, label %vector.body16, !llvm.loop !19
                                                                  %99 = icmp eq i64 %index.next, %n.vec
                                                                  br i1 %99, label %middle.block, label %vector.body, !llvm.loop !22
                                                                 middle.block:
                                                                                                                                                                                                                     middle.block14:
                                                                                                                                                                                                                     %cmp.n32 = icmp eq i64 %umax, %n.vec28
br i1 %cmp.n32, label %pregion_for_end.i, label
                                                                 %cmp.n = icmp eq i64 %umax, %n.vec
                                                                 br i1 %cmp.n, label %pregion for end.i, label
                                                                 ... %pregion for entry.entry.i.us.preheader35
                                                                                                                                                                                                                      ... %pregion for entry.entry.i.preheader36
   pregion for entry.entry.i.us.preheader35:
                                                                                                                                               pregion for entry.entry.i.preheader36:
    % local id \bar{x}.0.us.ph = phi i64 [ 0, %vector.scevcheck ], [ 0,
                                                                                                                                               % local id x.0.ph = phi i64 [0, %vector.scevcheck25], [0, %vector.sc
     .. %pregion for entry.entry.i.us.preheader], [%n.vec, %middle.block]
                                                                                                                                                ... \(\sigma\) pregion for entry.entry.i.preheader ], [\(\sigma\)n.vec28, \(\sigma\) middle.block14 ]
    br label %pregion for entry.entry.i.us
                                                                                                                                               br label %pregion for entry.entry.i
                                                                                                                                      pregion for entry.entry.i:
                                                                                                                                       % local id \bar{x}.0 = phi i64 [ %106, %pregion_for_entry.entry.i ], [
                                                                                                                                      ... %_local_id_x.0.ph, %pregion_for_entry.entry.i.preheader36 ] %add1.i.i = add i64 %_local_id_x.0, %mul.i.i, !llvm.access.group !12
                                                                                                                                       %conv.i = trunc i64 %add1.i.i to i32, !llvm.access.group !12
                                                                                                                                       %add14.i = add nsw i32 %mul.i, %conv.i, !llvm.access.group !12
                                                                                                                                       %idxprom15.i = sext i32 %add14.i to i64, !llvm.access.group !12
                                                                                                                                       %arrayidx16.i = getelementptr inbounds float, float* %2, i64 %idxprom15.i,
pregion for entry.entry.i.us:
                                                                                                                                        ..!llvm.access.group!12
% local id x.0.us = phi i64 [ %101, %pregion_for_entry.entry.i.us ], [
                                                                                                                                       %102 = load float, float* %arrayidx16.i, align 4, !tbaa !15,
... %_local_id_x.0.us.ph, %pregion_for_entry.entry.i.us.preheader35 ] %add1.i.i.us = add i64 %_local_id_x.0.us, %mul.i.i, !llvm.access.group !12
                                                                                                                                       ..!llvm.access.group!12
                                                                                                                                      %conv17.i = fpext float %102 to double, !llvm.access.group !12
%arrayidx21.i = getelementptr inbounds float, float* %3, i64 %idxprom15.i,
 %conv.i.us = trunc i64 %add1.i.i.us to i32, !llvm.access.group !12
%100 = load float, float* %arrayidx.i, align 4, !tbaa !15,
                                                                                                                                       ...!llvm.access.group!12
                                                                                                                                       %103 = load float, float* %arrayidx21.i, align 4, !tbaa !15,
 ..!llvm.access.group!12
%add10.i.us = add nuw nsw i32 %mul.i, %conv.i.us, !llvm.access.group !12 %idxprom11.i.us = sext i32 %add10.i.us to i64, !llvm.access.group !12
                                                                                                                                       ..!llvm.access.group!12
                                                                                                                                       %add23.i = add nsw i32 %mul22.i, %conv.i, !llvm.access.group !12
                                                                                                                                       %idxprom24.i = sext i32 %add23.i to i64, !llvm.access.group !12
 %arrayidx12.i.us = getelementptr inbounds float, float* %2, i64
... %idxprom11.i.us, !llvm.access.group !12
                                                                                                                                       %arrayidx25.i = getelementptr inbounds float, float* %3, i64 %idxprom24.i,
 store float %100, float* %arrayidx12.i.us, align 4, !tbaa !15,
                                                                                                                                        ..!llvm.access.group!12
                                                                                                                                       %104 = load float, float* %arrayidx25.i, align 4, !tbaa !15,
 ..!llvm.access.group!12
%101 = add nuw i64 %_local_id_x.0.us, 1
%exitcond3.not = icmp eq i64 %101, %umax
br i1 %exitcond3.not, label %pregion_for_end.i.loopexit, label
                                                                                                                                       ...!llvm.access.group!12
                                                                                                                                       %sub26.i = fsub float %103, %104, !llvm.access.group !12
                                                                                                                                       %conv27.i = fpext float %sub26.i to double, !llvm.access.group !12
... %pregion_for_entry.entry.i.us, !llvm.loop !23
                                                                                                                                       %105 = tail call double @llvm.fmuladd.f64(double %conv27.i, double
                                                                                                                                       ... -5.000000e-01, double %conv17.i) #3, !llvm.access.group !12
                                                                                                                                      %conv29.i = fptrunc double %105 to float, !llvm.access.group !12
                                                                                                                                      store float %conv29.i, float* %arrayidx16.i, align 4, !tbaa !15,
                                                                                                                                       ..!llvm.access.group!12
                                                                                                                                      %106 = add nuw i64 %_local_id_x.0, 1
                                                                                                                                      %exitcond.not = icmp eq i64 %106, %umax
br i1 %exitcond.not, label %pregion_for_end.i.loopexit38, label
                                                                                                                                       ... %pregion_for_entry.entry.i, !llvm.loop 124
                                                                                                                                           pregion for end.i.loopexit38:
                                         pregion for end.i.loopexit:
                                          br label %pregion for end.i
                                                                                                                                             br label %pregion for end.i
                                                                                                                         pregion for end.i:
                                                                                                                          \%107 = add nuw i64 % local id y.0, 1
                                                                                                                         %exitcond5.not = icmp eq i64 %107, %umax4
br i1 %exitcond5.not, label %fdtd_kernel1.exit, label
                                                                                                                          ... %pregion for entry.pregion for init.i, !llvm.loop !25
                                                                                                                               fdtd kernel1.exit:
```

%11:

ret void