```
# Index manipulations
#--------------------
"""
    permute(tsrc::AbstractTensorMap{S}, p1::NTuple{N₁, Int}, p2::NTuple{N₂, Int} =
())
        -> tdst::TensorMap{S, N₁, N₂}

Permute the indices of `tsrc::AbstractTensorMap{S}` such that a new tensor
`tdst::TensorMap{S, N₁, N₂}` is obtained, with indices in `p1` playing the role of
the
codomain or range of the map, and indices in `p2` indicating the domain.

To permute into an existing `tdst`, see [`add!`](@ref)
"""
function permute(t::TensorMap{S},
                    p1::IndexTuple{N₁},  p2::IndexTuple{N₂}=();
                    copy::Bool = false) where {S, N₁, N₂}
    cod = ProductSpace{S, N₁}(map(n->space(t, n), p1))
    dom = ProductSpace{S, N₂}(map(n->dual(space(t, n)), p2))
    # share data if possible
    if !copy
        if p1 === codomainind(t) && p2 === domainind(t)
            return t
        elseif has_shared_permute(t, p1, p2)
            return TensorMap(reshape(t.data, dim(cod), dim(dom)), cod, dom)
        end
    end
    # general case
    @inbounds begin
        return add!(true, t, false, similar(t, cod←dom), p1, p2)
    end
end

function permute(t::AdjointTensorMap{S}, p1::IndexTuple, p2::IndexTuple=();
                    copy::Bool = false) where {S}
    p1′ = map(n->adjointtensorindex(t, n), p2)
    p2′ = map(n->adjointtensorindex(t, n), p1)
    adjoint(permute(adjoint(t), p1′, p2′; copy = copy))
end

function has_shared_permute(t::TensorMap, p1, p2)
    if p1 === codomainind(t) && p2 === domainind(t)
        return true
    elseif sectortype(t) === Trivial
        stridet = i->stride(t[], i)
        sizet = i->size(t[], i)
        canfuse1, d1, s1 = TO._canfuse(sizet.(p1), stridet.(p1))
        canfuse2, d2, s2 = TO._canfuse(sizet.(p2), stridet.(p2))
        return canfuse1 && canfuse2 && s1 == 1 && (d2 == 1 || s2 == d1)
    else
        return false
    end
end
```

```
function has_shared_permute(t::AdjointTensorMap, p1, p2)
    p1′ = adjointtensorindices(t, p2)
    p2′ = adjointtensorindices(t, p1)
    return has_shared_permute(t', p1′, p2′)
end

"""
    permute!(tdst::AbstractTensorMap{S, N₁, N₂}, tsrc::AbstractTensorMap{S},
        p1::IndexTuple{N₁}, p2::IndexTuple{N₂}=()
    ) -> tdst

Permute the indices of `tsrc` and write the result into `tdst`, with indices in
`p1` playing
the role of the codomain or range of the map `tdst`, and indices in `p2` indicating
the
domain of `tdst`.

For more details see [`add!`](@ref), of which this is a special case.
"""
@propagate_inbounds Base.permute!(tdst::AbstractTensorMap{S, N₁, N₂},
                                  tsrc::AbstractTensorMap{S},
                                  p1::IndexTuple{N₁},
                                  p2::IndexTuple{N₂}=()) where {S, N₁, N₂} =
    add_permute!(true, tsrc, false, tdst, p1, p2)

# Braid
function braid(t::TensorMap{S}, levels::IndexTuple,
                   p1::IndexTuple, p2::IndexTuple=();
                   copy::Bool = false) where {S}
    @assert length(levels) == numind(t)
    if BraidingStyle(sectortype(S)) isa SymmetricBraiding
        return permute(t, p1, p2; copy = copy)
    end
    if !copy && p1 == codomainind(t) && p2 == domainind(t)
        return t
    end
    # general case
    cod = ProductSpace{S}(map(n->space(t, n), p1))
    dom = ProductSpace{S}(map(n->dual(space(t, n)), p2))
    @inbounds begin
        return add_braid!(true, t, false, similar(t, cod←dom), p1, p2, levels)
    end
end
@propagate_inbounds braid!(tdst::AbstractTensorMap{S, N₁, N₂},
                               tsrc::AbstractTensorMap{S},
                               levels::IndexTuple,
                               p1::IndexTuple{N₁},
                               p2::IndexTuple{N₂}=()) where {S, N₁, N₂} =
    add!(true, tsrc, false, tdst, p1, p2, levels)

# Transpose
LinearAlgebra.transpose!(tdst::AbstractTensorMap, tsrc::AbstractTensorMap,
                                  p1::IndexTuple, p2::IndexTuple) =
    add_transpose!(true, tsrc, false, tdst, p1, p2)
```

```
function LinearAlgebra.transpose(t::TensorMap{S},
                                 p1::IndexTuple = reverse(domainind(t)),
                                 p2::IndexTuple = reverse(codomainind(t));
                                 copy::Bool = false) where {S}
    if sectortype(S) === Trivial
        return permute(t, p1, p2; copy = copy)
    end
    if !copy && p1 == codomainind(t) && p2 == domainind(t)
        return t
    end
    # general case
    cod = ProductSpace{S}(map(n->space(t, n), p1))
    dom = ProductSpace{S}(map(n->dual(space(t, n)), p2))
    @inbounds begin
        return add_transpose!(true, t, false, similar(t, cod←dom), p1, p2)
    end
end

function LinearAlgebra.transpose(t::AdjointTensorMap{S},
                                 p1::IndexTuple = reverse(domainind(t)),
                                 p2::IndexTuple = reverse(codomainind(t));
                                 copy::Bool = false) where {S}
    p1′ = map(n->adjointtensorindex(t, n), p2)
    p2′ = map(n->adjointtensorindex(t, n), p1)
    adjoint(transpose(adjoint(t), p1′, p2′; copy = copy))
end

# Twist
twist(t::AbstractTensorMap, i::Int; inv::Bool = false) = twist!(copy(t), i; inv =
inv)

function twist!(t::AbstractTensorMap, i::Int; inv::Bool = false)
    if i > numind(t)
        msg = "Can't twist index $i of a tensor with only $(numind(t)) indices."
        throw(ArgumentError(msg))
    end
    BraidingStyle(sectortype(t)) == Bosonic() && return t
    N₁ = numout(t)
    for (f1, f2) in fusiontrees(t)
        θ = i <= N₁ ? twist(f1.uncoupled[i]) : twist(f2.uncoupled[i-N₁])
        inv && (θ = θ')
        rmul!(t[f1, f2], θ)
    end
    return t
end

# Fusing and splitting
```