Ideas for beam distributions

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Idea

- Uniform handling of creating and fitting profiles
- Distribution objects (Gaussian, BinominalAmplitudeN, …) used to compute analytical profiles (integral, spectrum,…)
  - Consistency for different type of bunch lengths (RMS, FWHM, …)
- Fit routines should have common (time_array, data_array) call signature
  - Output should be usable to construct distribution objects
- Development on BLonD_common/tree/fitting_overhaul
  - Fitting routines in `fitting/profile.py`
  - Analytic profiles in `interfaces/beam/analytic_distribution.py`
  - Global default parameters (BLonDrc) in `devtools/`
  - Examples in `__EXAMPLES/fitting/`

Distribution object

- All distributions (Gaussian, BinominalAmplitudeN, …) derived from base class `_DistributionObject`
- Calling signatures for all analytic distributions:
  - `Distribution([parameters])` → creates distribution object from these parameters and computes parameters like RMS, FWHM, full_bunch_length
  - `Distribution([parameters], time_array=t_data)` → returns profile evaluated at `t_data`
  - `Distribution([None], time_array=t_data, data_array=y_data)` → performs a fit of the profile to `(t_data, y_data)` and creates a distribution object from the fit parameters
  - `Distribution([parameters], time_array=t_data, data_array=y_data)` → as before, but uses `parameters` as initial guess for fit
- Methods to compute profile, integral, and spectrum of distribution
- Bunch lengths `RMS`, `FWHM`, `full_bunch_length` implemented as properties to ensure that all update if one of them changes (consistency!)
- Uses BLonDrc parameters to ensure consistency between return values from fit functions and distribution objects

…

- Currently `Gaussian`, and `BinominalAmplitudeN` are implemented (and covered with unittests!)

In future:

- Implement `distribution` and `phase_space` methods to compute profile in action (or Hamiltonian) and phase space distribution in dt, ΔE
  - needed to create matched beams and ensures consistency between phase space and profile

Comments?