ABSTRACT:
A lot of studies have been carried through out the world to study environmental suspended particle, and its nature. But in current work we select the second largest contributor after CO2 which is Black carbon (BC) or Soot. Black carbon reduction is a great challenge for whole world. We calculate the optical properties (Absorption co-efficient, scattering co-efficient, Extinction co-efficient). For calculation of optical properties of black carbon we use two method experimentally and computationally.

COMPUTATIONAL DETAILS:
DENSITY FUNCTIONAL THEORY (DFT):
DFT is the most effective quantum mechanical approach to calculate the structural, electronic, optical, magnetic, thermolectric etc. properties of materials. In DFT, electron density approach is used that deals only with 3 variables (i.e. x, y and z) instead of 3N variables, so that 3N equations are reduced to 3equations.

WIEN2k code:
The WIEN2K code is a computer program used to study the ground state physical properties of solid materials by using DFT.

EXPERIMENTAL DETAILS:
For this calculation we use Aethalometer device through which we are able to collect the total concentration of Black carbon in the Atmosphere. The concentration of black carbon was collected for two days at Peshawar university, Physics Department.

OPAC MODEL:
After collecting Concentration of black carbon we calculate optical properties through this model.

VARIATION OF OPTICAL PROPERTIES OF BLACK CARBON WITH RELATIVE HUMIDITY (RH):
The optical properties of black carbon is directly linked with Relative humidity. In this work we calculate the optical properties of black carbon with three different relative humidity one is 50%, second is 80%, and last one is 99%. When gradually the relative humidity increase the optical properties of Black carbon also increase.

SIZE AND SHAPE:
Black carbon particles are more spherical than graphite and have a less uniform crystalline structure. When black carbon is heated to 3000° C (5400° F) for a long time, it transforms into graphite. These particles ranged in size from 216nm to 22m. Figure 1 depicts the shape of black carbon.

OPTICAL PROPERTIES:
The optical properties of a compound are depending on band structure. The internal structure of a material can be explained with the help of the optical spectra.

ABSORPTION CO-EFFICIENT:
With the help of Absorption co-efficient we calculate light absorb by black carbon in atmosphere.

SCATTERING CO-EFFICIENT:
By scattering co efficient we calculate the light reflection or scattered by black carbon in atmosphere.

EXTINCTION COEFFICIENT:
Extinction coefficient (o) gives the information about the absorption of incident light through a material. The atmospheric extinction coefficient (btext), which is the sum of scattering and absorption by particles is a measure of the alteration of radiant energy as it passes through the atmosphere.

CONCLUSION:
The difference of optical properties have close relationship with Relative humidity and wavelength. When the wavelength is nearly 3μm the optical properties of black carbon have the biggest difference. The optical properties of black carbon are increasing with the increase of relative humidity. In above Figures having relative humidity are 50%, 80%, 99% percent. Maximum wavelength for the first three plots is 0.750μm and minimum is 0.300μm for all three RH. Optical properties of black carbon and RH have inverse relation if Wavelength gradually increase the plot will gradually decrease as we can see in above graphs.

Zeb, Bahadar et al: Carbonaceous particle clusters were also identified, as represented in Fig. 2. The combustion of fuels and biomass are the sources of these particles. Agricultural burning and trash incineration may also produce these particles.

MAIN SOURCE OF BLACK CARBON:
The sources of these particles are the burning of fuels and biomass. These particles may also be produced due to agricultural burning and waste incineration. The excessive use of motorbikes and motorcycles in Peshawar largely produces Zn from the combustion of lubricating oil. The extensive use of diesel engines in Peshawar emits high concentrations of BC. The major source of black carbon (BC) in the atmosphere is the incomplete combustion of fossil fuels and biomass burning.